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THE NARANGWAL POPULATION STUDY

INTEGRATED HEALTH AND FAMILY PLANNING SERVICES

RURAL HEALTH RESEARCH CENTER

NARANGWAL, PUNJAB, INDIA

1975

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Names are all listed in reverse alphabetical order within each group.

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PREFACE

The current surge of interest in the integration of health and family planning programs makes this report especially timely. Around the world a number of demonstration projects are underway or being planned. Since the Bucharest World Population Conference more attention is being given to the linkages between family planning programs and other development sectors, including health.

The research at Narangwal was planned as part of India's effort to resolve emerging problems related to family planning and population control. As the first country to have a national policy and program promoting family planning, Indian officials had by the mid-1960s become aware of important issues that needed careful study. It was becoming evident that these studies had to be done in the Indian context. These forward thinking leaders were recognizing that the initial successes of the mass campaign and "camp" approaches, especially promoting sterilizations, had to be phased into solid and continuing services reaching out to village homes. New patterns of services had to be developed and this would require new relationships in the health team, new training and orientation, maximum use of village level auxiliaries, and the involvement of communities in solving their own problems. To be convincing these activities needed to be developed and tested in a research framework.

This is a preliminary report of almost five years of field research growing out of the above concerns. Further analyses are being done and formal publications will be forthcoming. Premature termination of the field work left many of the research questions

unanswered - including definitive data relating to the child survival hypothesis which was a major scientific objective of this study. There was much that was learned, however, that will be of primary value to those establishing demonstration projects, implementing action programs, or making the urgent policy decisions about the degree to which health and family planning programs can or should be integrated.

For those of us who were privileged to be part of the Narangwal experiment it seems inadequate to attempt to record what we learned in reports and publications. There was a depth and continuity in the experience of sharing with village communities a search for a better life that goes beyond usual patterns of reporting. A quality of effort emerged that came to be referred to as the Narangwal spirit which was based on a shared sense of doing difficult work with a high sense of idealism. In this sharing the members of the staff came to feel very close to our village hosts. The sharing also included the many officials and educators around India who contributed directly to the ideas and work and whose support in innumerable ways made them all members of the research team.

We formally acknowledge our deep indebtedness to a series of senior government officials in the Ministry of Health and Family Planning who supported the village work formally and through personal interest and involvement. This includes ministers, secretaries of various ranks and officials of the Directorate of Health and Commissioner of Family Planning offices. We were particularly dependent on our close working relationships with State and District officials who supported the work in many ways including the deputation of personnel. Our official liaison was with the Indian Council of Medical Research and we relied greatly on the wisdom and involvement of a series of Directors General, and other officials. Many educators and scientists in educational and research institutes

worked with us and were unfailing in their cooperation. We were continuously impressed by the numbers of officials who took the trouble to visit us in the villages to get deeply involved in sharing and improving our efforts.

From international agencies, too, we gained invaluable support. Many workers from many disciplines and countries visited or cooperated in both field work and analysis. Funding was incremental and in addition to the Indian Council of Medical Research we received support from USAID, WHO, NIH, and several private voluntary agencies.

Those of us who have been analyzing the data and writing this report have been constantly aware that we are representing the larger team that did the field work. We have tried to list those involved because we feel that those who did the hard day-to-day work in the villages need primary recognition.

Then, of course, our greatest gratitude and affection must be expressed to the wonderful people of our experimental villages. Along with their unmatched hospitality we were conscious of their increasingly effective drive to develop and to find solutions for their own problems. This research effort was, we hope, a part of that process.

SUMMARY OF FINDINGS

THE NARANGWAL POPULATION STUDY:
Integrated Health and Family Planning Services

SUMMARY OF FINDINGS

The population study of the Narangwal Rural Health Research Center was a collaborative international action research project with ambitious goals. It was set up to measure the impact of several integrated packages combining different health and nutrition service components with family planning. The outcome parameters included both fertility indices and various measures of health and nutritional status. The data were collected in an experimental framework which also permitted comparative evaluation of the simultaneous dynamic interactions of multiple socioeconomic variables. In the process of developing the service inputs for the experimental design a major effort was made to evolve low cost service packages as a demonstration of what can be accomplished by middle level family health workers (FHW). The study was longitudinal and prospective but was terminated before definitive data gathering was completed.

The research was initiated at the request of the highest Indian Government Health and Family Planning officials and throughout policy was set in consultation with Indian authorities. It involved multiple Indian institutions and one American institution. Over 200 Indian professionals and staff provided the continuing strength in planning and implementing field activities. On an average, two to three expatriates served in the field in rotation and they came from six countries. The final decisions about the implementation of the research were made by the village communities and their panchayats since the program depended ultimately on their cooperation and participation.

The Narangwal population study was started at a time when the Indian national family planning program was undertaking massive and concentrated efforts to publicize the small family norm and reach large numbers through a focussed "camp" approach with much use of targets and incentives. But perceptive national leaders were aware that more balanced and continuing long-term services would be needed. They wanted to find out how effective family planning activities could be made part of routine services.

The research had two goals: for general international and scientific interest there were a complex set of research hypotheses and models which were tested in an experimental design in which different service packages were inputs leading to quantification of input-output-outcome relationships that can be used for cost/effectiveness and cost/benefit analyses; for the pragmatic program development needs of India the major research-demonstration purpose was to evolve low cost packages of integrated services for rural areas.

Funding for the project was obtained from many sources including the Indian Council of Medical Research, US/AID, WHO, HEW, and a number of private voluntary agencies. Most of the money went into research measurement and analysis. The service costs were carefully analyzed and the comprehensive care package that was eventually evolved cost about $2 per capita per year. If estimates are equated to what the costs would have been with the economies of scale possible under Punjab government services, the cost would be close to $1 per capita per year (Tables III.D.1 through III.D.10).

A. DESCRIPTION OF INITIAL SITUATION

Punjab villages proved an unusually good study area for this kind of in-depth research that required relatively sophisticated data gathering. These villages enjoyed rapid socioeconomic development during the study period and this has permitted analysis of the interactions between health, population and other development sectors that will be important elsewhere as more areas show rapid development. It was planned that study findings would be further tested in demonstration projects as the next stage in

getting wider implementation and the goal then would have been to work in much more needy areas.

1. Socioeconomic Patterns

The 26 villages with 35,000 population that were included in the study had many similarities but some importance differences. The experimental design provided for grouping villages so as to control for exogenous variables in a dynamically changing socioeconomic environment. We also measured the strength of interactions between experimental and exogenous variables so as to try to sort out some causal relationships. The data show that the experimental groups were similar in most of the measurable indicators (Tables II.A.1 through II.A.4).

As expected, the variable that seemed to have the strongest influence on other factors was caste. Caste differences were shown to have even greater impact on some outcomes than the experimental service packages. Account has to be taken, therefore, of caste differences in study groups; for example, the lowest castes in various experimental groups ranged from 26 to 40 percent of the population (Table II.A.1). An unexplained finding is that in some villages where economic indicators were high some of the social indicators such as housing and environmental amenities were low. This presumably reflects differences in the priorities of villages. The Jat caste was homogenously high on both economic and social indicators. The Ramdasias or lowest castes were quite heterogeneous in socioeconomic indicators and showed the greatest health and nutritional deficits.

2. Demographic Patterns

For this study the general fertility trends in rural Punjab are probably the background variable which must be most carefully accounted for in the analysis. There had been a steady decline in fertility during the decade prior to the start of the project in 1969. Data from the Punjab generally and from Ludhiana District show that birth rates had fallen from

about 40 to the mid-30's. Our detailed data from pregnancy histories suggest that in these villages there probably was a slight leveling off of the rate of decline starting about 1966 (Tables II.B.2 and Figure II.B.1). The massive state program for family planning did not get started until 1965 and suffered a major setback from widespread rumors about complications from IUD's. The mass programs for sterilization then became progressively more effective.

An important variable defined in the Khanna Study (Wyon and Gordon 1971), which was a decade earlier and only 26 miles away, was the great importance of rising age at marriage for women. Our background information shows that mean age at first marriage increased from 12.8 years for those married before 1940 to 19.3 years for those married after 1970. In the Punjab a second ceremony, Muklawa, takes place when cohabitation starts and the mean age for the same groups of women for Muklawa increased from 15 years to 19.8 years (Tables II.B.3 - II.B.4).

The fertility patterns in all experimental groups of the research design appeared to have been fairly uniform during the years before the project began. This is indicated by the minimal differences in mean age for given parities or pregnancy order. For all women in the study population the mean parity was 4.0, mean number of pregnancies 4.2 and the mean age at parity 4 was 33.3 years (Tables II.B.5 - II.B.8). As will be pointed out, the only discrepancy between study groups was an unexplained relative deficit of younger women in the family planning education group of villages.

B. IMPACT OF SERVICES

The research design provided for five different experimental groups of villages which received the following combinations of services: family planning, women's services and child care (FP+WS+CC); family planning and women's services (FP+WS); family planning and child care (FP+CC); family planning services and education (FP-Ed); and control (CONT-P)

ITY OF SERVICE PACKAGES

FAMILY PLANNING

1. Education and Motivation	Intense educational efforts were provided in FP-Ed; education was well integrated with health care delivery in FP+WS+CC and FP+WS; and poorly integrated in FP+CC.
2. Contraceptive Services	Condoms, pills (Ovulen and an Indian marketed low dose pill, Primovolar); IUDs (Lippes and Narangwal "Taviti"); injectable Depo-Provera; vasectomies and tubectomies were provided under similar conditions in all experimental groups.
3. Follow-up	The same method and specific patterns of follow-up were established for all groups.

WOMEN'S SERVICES

1. Monitoring fertility and early diagnosis of pregnancy	Routine in FP+WS+CC, FP+WS and FP+CC; carried out in simplified form in FP-Ed.
2. Prenatal and postnatal care and supervision of deliveries done by dais (indigenous midwives)	Well developed pattern in FP+WS+CC and FP+WS modified prenatal care provided in FP+CC as part of child care.
3. Diagnosis, treatment and referral of illnesses	Done only in FP+WS+CC and FP+WS

CHILD CARE

1. Periodic health checks up to 3 years of age	Weekly monitoring of morbidity status in FP+CC; much less frequent home visiting in FP+WS+CC.
2. Periodic measurement of weight and height	Routine ranged from every month for infants to every 3 months at 3 years of age for both FP+WS+CC and FP+CC
3. Immunization	Smallpox and DPT in FP+WS+CC and FP+CC.
4. Nutrition supplementation and education	Selective provision of supplements to malnourished or faltering children, and education of mothers of all children in FP+WS+CC & FP+CC.
5. Diagnosis, treatment and referral of illness	Early care emphasized in FP+WS+CC and FP+CC.

Data were also gathered on clusters of three aditional groups of villages in a parallel nutrition project (NUT Other). A major methodological problem was that we could not start services in all groups of villages at the same time so that duration of service programs varied from just under two to four and a half years.

Differential impact in these experimental groups was measured according to the parameters which follow:

1. Family Planning Utilization

a. From cross-sectional surveys of knowledge and practice of contraception the following conclusions emerged:

(1) Except for IUDs and pills, knowledge about modern contraceptive methods increased equally in all groups of villages including the controls. Knowledge about pills increased only in those experimental groups in which the project was offering family planning services and not in controls, whereas knowledge about IUDs actually decreased in most groups (Tables II.D.1 through II.D.6).

(2) Statements admitting to knowledge about traditional or folk methods declined sharply (Tables II.D.8 - II.D.9).

(3) The use of non-device methods declined in FP villages, presumably a substitution effect (Table II.D.5).

(4) Use rates according to responses in the cross-sectional surveys were distinctly lower than actual use as recorded in the service program. In repeated cross-sectional surveys, consistency of statements about methods which had been used was very poor (Tables II.D.10 - II.D.13).

(5) Control village use rates of modern contraceptives remained unchanged as measured by the two cross-sectional surveys, with the level at 9 percent of eligible couples (Tables II.D.1 through II.D.6).

b. Longitudinal contraceptive practice* as a result of project

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* Longitudinal data on contraception was not available in control villages.

services showed:

(1) Remarkably parallel acceptance curves in all experimental groups over the first two years and then some divergence. The percentages of ever-users to total eligible couples after differing durations of family planning services were:

Experimental Group	Duration of Services and Rates		
	1-3/4 years	3-1/4 years	4-1/2 years
FP+WS+CC	32 %	43 %	51 %
EP+WS	33 %	46 %	54 %
FP+CC	36 %	46 %	-
FP-Ed	37 %	-	-

All curves were still rising and showed no indication of the plateau levels which it had been hoped that the project would define. The FP-Ed villages which had a remarkable rate of increase in the first year, showed a dropping back to the slope of the other curves in the second year (Table IV.A.2 and Figure IV.A.1).

(2) The most important family planning data are current user rates, when drop-outs are subtracted from acceptors. The curves for FP+WS+CC and for FP+WS steadily increased in linear and parallel fashion throughout the project. The curve for FP+CC plateaued during the last two years. The curve for FP-Ed had the most rapid initial increase but then slowed to parallel the rate of increase of the other curves. The percentages of current users to total eligible couples were: (Table IV.A.2, Fig. IV.A.2).

Experimental Group	Duration of Services and Rates		
	1-3/4 years	3-1/4 years	4-1/2 years
FP+WS+CC	22 %	26 %	34 %
FP+WS	25 %	34 %	41 %
FP+CC	27 %	20 %	-
FP-Ed	30 %	-	-

(3) The balance of various contraceptive methods is obviously important especially since couples were encouraged to adopt the more effective methods (Table IV.A.7). When current user rates were corrected for the varying effectiveness of the mix of contraceptives being used, an effective use rate was obtained. This rate comes closest to measuring the probable protection from pregnancy provided by the family planning programs in each experimental group. The effective use rates showed a steady increase in all experimental groups with the absolute levels being on an average 25 percent lower than current-user rates. The greatest difference was noted in the FP-Ed group because this group had the highest use of the less effective methods (especially condoms). The FP+WS group had the least reduction of rates due to greater use of more effective methods. The FP+CC group did not show the plateauing seen with current user rates indicating a progressive shift to more effective methods. The effective use rates expressed as percentages of total eligible couples were: (Table IV.A.2, Figure IV.A.3)

Experimental Group	Duration of Services and Rates		
	1-3/4 years	3-1/4 years	4-1/2 years
FP+WS+CC	15 %	18 %	24 %
FP+WS	19 %	25 %	31 %
FP+CC	18 %	21 %	-
FP-Ed	20 %	-	-

(4) The two year continuation rates were good for all methods except pills and condoms and failure rates were also highest for those methods (Tables IV.A.16 - IV.A.19)

(5) Method specific fertility rates were fairly uniform in all groups as were pregnancy rates among non-users and among users during breaks in contraception (Table IV.C.1)

2. Changes in Fertility

a. The intensive data gathering from diverse sources permitted multiple methods of analysis and the first and most important point to be

made is that the results are internally consistent regardless of which indices are examined.

b. The control villages showed a very slow fertility decline and this may reflect what seems to have been a general slowing of fertility decline in Ludhiana District (Tables IV.B.2 - IV.B.5). There was no change in median fertility or in excess fertility based on age-parity grids in the control group (Tables IV.B.10, IV.B.12 and IV.B.14).

c. The two groups FP+WS+CC and FP-Ed showed definite reductions in fertility:

(1) Fertility (CBR, Age adjusted GFR, TFR) declined sharply by 17-19% from 1969-70 to 1973 about 5% per year (Tables IV.B.2 through IV.B.5).

(2) There was a shift downward in median parity of more than 0.5 child from 1969-70 to 1973 (Tables IV.B.12, IV.B.13).

(3) There was marked reduction in "excess fertility," calculated from Age-Parity grids which indicated a reduction in high parity births and in births to mothers at very young and old ages (Tables IV.B.6, , IV.B.9, IV.B.14).

d. FP+WS showed:

(1) A fertility reduction equal to those of FP+WS+CC and FP-Ed above, of about 5% per year according to all measures (Tables IV.B.2 through IV.B.5).

(2) Little change in median parity (Tables IV.B.12, IV.B.13).

(3) Only slight reduction in "excess fertility" (Tables IV.B.7, IV.B.14). The lack of shift in the latter two indicators suggests that these services, which concentrated on providing integrated care for all women, succeeded in getting an overall drop in fertility that was spread uniformly over all parities and ages.

e. FP+CC showed:

(1) An intermediate rate of decline of 5 percent in fertility indices, clearly below the above three experimental groups but greater than those in control villages (Tables IV.B.-IV.B.5).

(2) A shift in median parity of about 0.5 child, a decline from 1969-70 to 1973 equaling that of the FP+WS+CC and FP-Ed villages (Tables IV.B., IV.B.13).

(3) Moderate reduction in excess fertility (Tables IV.B.8, IV.B.14). We speculate that the fertility effects may possibly be related to greater use of spacing by young mothers.

f. The data from the FP-Ed group of villages must be interpreted with caution: there was an unexplained discrepancy in age distribution with relatively fewer young women reported in this population (Table IV.B.1, Figure IV.B.1); longitudinal data collection was for less than two years so the earlier periods are based on retrospective data; and the impact of the almost two years of the service program would necessarily have been partial because of the nine months that must be allowed for gestation.

3. Changes in Attitudes and Beliefs

A major effort was made to measure attitudes and beliefs through repeated cross-sectional surveys of all women 15-49 years of age. It was hoped that some of the dynamics of motivational change could be quantified in relation to research questions such as the child survival hypothesis.

a. Attitudes and beliefs about family planning:

(1) The proportion of women who expressed general approval of family planning had declined from earlier surveys in India with only 54 percent approving of family planning for a family like theirs, and 28 percent disapproving (Table II.C.1). It may be speculated that this may have been part of the backlash to the rumors about IUDs. During the project period the general approval rate increased to 66 percent (Table II.C.1)

The lowest initial approval rate was in FP+WS+CC and there were several other attitudinal indications that this was the most conservative group of villages. In all villages, 90 percent of families were in favor of spacing rather than having their children and then stopping (Text, page II.C.8).

(2) Attitudes to family size or statements about what they considered to be an ideal number of children for a family like theirs were the same in both surveys. About 55 percent said they wanted three or less and this went up to 77 percent for four or less. The highest proportion of respondents in the first survey who considered four or more children ideal was in FP+WS+CC, perhaps again an indication of conservatism (Table II.C.17).

(3) Attitudes to specific methods of family planning focussed on two contraceptives which were of particular interest in the Punjab in the 1960's. There was a strong public demand for injections which were requested by 40 percent of women in the first survey. After injectable Depo-Provera was provided as part of the experiment, those favoring injections dropped to 33 percent. In the first survey there was great anxiety expressed about the complications of IUDs but this declined by the second survey (Text page II.C.9-10).

(4) Sources of communication about family planning are obviously important in motivation. There was a strong association between approval of family planning and whether women had talked with their husbands about family planning. The lowest frequency of talking with husbands was in FP+WS+CC. There was also a strong positive association between talking with husbands and caste, husband's education and occupation, and the age of women at marriage (Table II.C.2, II.C.5, II.C.6).

b. Attitudes and beliefs relating to child survival hypothesis.

Testing the child survival hypothesis was one of the main research objectives of the project. We had previously redefined the generally accepted statement of this hypothesis to focus on the probability that conscious awareness of improved child survival is not a necessary or automatic condition for fertility limitation but that subconscious expectations may serve as a powerful motivational force.

(1) We are not able to provide definitive information on the child survival hypothesis because the project was terminated before plateaus had occurred in family planning utilization curves and before the anticipated lag in changed perceptions of child survival could have been expected to change motivation. As a result we can only present partial evidence suggesting that motivational changes were, in fact, occurring in experimental groups.

(2) Questions were asked in various ways to try to sort out the internal dynamics of these motivational relationships. Awareness of improved survival of children on the first survey was not high, only one-third of women said more children survive than thirty years ago, while one-fifth said less survive and almost one half said the same number survive or were uncertain (Table II.C.7). The fact is that child mortality had been reduced generally to about half of what it had been ten years earlier in the Khanna project. In the second survey there was an unexpected decline in numbers saying more children survive except in the FP+WS+CC experimental group which showed a definite increase in awareness of greater survival (Table II.C.7). But this increase in awareness of survival was not true in FP+CC where the improvement in child mortality had been most marked. In FP+CC we never achieved integration of services since a male doctor provided pediatric back-up and a woman doctor provided family planning back-up. As a result the FHWs also separated these functional areas in their own patterns of work. These differences in awareness presumably show the impact of better integration of services and support the idea that parental awareness of survival is normally a subconscious expectation rather than an overt opinion but that a deliberate use of family planning entry points can bring about changed awareness.

A question probed attitudes to "insurance births" by asking whether it would be safer to have more children because some might die. Cross-tabulation showed clear association with approval of family planning (Table II.C.13). The second survey showed a general shift to less need

for insurance births in all experimental groups (Table II.C.14). Further probing revealed that those who are aware that fewer children die are much more likely to respond positively to a question in which they were asked whether they would take this decline into account in thinking about how many children they will have (Table II.C.15). Of women in FP+WS+CC one-third said that they would take the improved chances of survival into account in thinking about their own family size as compared with one-fifth in all other groups (Table II.C.16). This again suggests that the effective use of entry points was having an impact on awareness of child survival and the desire for insurance births.

Greater awareness of child survival was positively associated with caste, husband's education and occupation, and with talking with husbands (Table II.C.9 - II.C.12).

4. Health Services Utilization

a. Maintenance of a high level of preventive services required careful structuring of functions and supervision otherwise they tended to be crowded out by curative services. Time pressures on workers in FP+WS+CC probably explain the fact that preventive women's services (including maternity care) were given the most time in FP+WS and preventive children's services were most complete in FP+CC (Tables III.A.29 - III.A.32).

b. The use of curative services by women and children were much higher in villages where they were served by a resident family health worker than in control villages (Tables III.C.3 - III.C.7).

c. Provision of services by project personnel only partially replaced use of previously available services, mostly indigenous private practitioners. The new patterns of use were therefore mainly additive and not a replacement for previous patterns of use (Tables III.C. - III.C.7).

5. Health Benefits from Service Programs

The major emphasis on health benefits was in a parallel research project on the interactions of malnutrition and infections in weaning age

children. The FP+CC group of villages was included in both projects and many measurements and services were deliberately synchronized to ensure direct comparability of results. Much of the attention to health benefits focussed on children since our population size was too small to permit effective measurement of changes in maternal health.

a. Nutrition supplementation of children improved both weight and height (Tables IV.D.1, IV.D.2 and Figures IV.D.1 and IV.D.2). This sounds obvious but as far as we know this is the first project in which the growth patterns of total populations of children have been shown to have been benefited by a nutrition program in comparison with control groups.

b. The number of siblings alive at the time of birth was significantly and inversely correlated with weight and height growth patterns of children (Text pages IV.E.5-6).

c. Perinatal mortality was 47 in FP+CC as compared with 96 in control groups. Perinatal and neonatal mortality were not improved significantly in any of the other experimental groups (Table IV.D.3).

d. Postneonatal infant mortality was lowest in those villages with the most intensive medical care, which were FP+CC and the Infectious Disease Control villages of the nutrition project (32 and 25 respectively). But in FP+WS+CC which had a lesser intensity of child care and frequency of home visits there did not appear to have been sufficient medical care to affect postneonatal infant mortality which was 52 compared with 41 in control villages. Nutrition inputs alone did not reduce infant mortality (Table IV.D.3).

e. The 12-35 month old child mortality rates were 23 in the control group compared with 8 in the FP+WS+CC and 11 in the FP+CC group (Table IV.D.3). It is important to realize, therefore, not only that there is synergism between malnutrition and infections but that there is also synergism between programs to control these conditions.

f. Statements about intention to have another child showed that such feelings were highest after the death of a child in those families having no male siblings (Table IV.D.7).

g. A strong relationship between high fertility and high mortality and retarded development was shown but the project was terminated before we could quantify the extent to which effective family planning will reduce mortality and improve health in children. We postulate that this effect will require a lag period of about five years for definitive demonstration in an action program.

C. SERVICES AND RESOURCES REQUIRED TO ACHIEVE PROGRAM EFFECTS

1. Costs for those components of services attributable directly to family planning, both for acceptors and for continuing users, was lowest in thw FP+WS+CC and highest in the FP-Ed group. In the second year of family planning service, costs per couple-year of effective protection were Rs 55 ($7) and Rs 189 ($25) respectively (Tables V.A.1 - V.A.3).

2. Total program costs (all services including family planning) per couple-year of effective protection were two to three times greater in the other service groups than in FP-Ed (Rs 206 or $28 per couple-year). The FP+WS group had the next lowest total cost per couple-year of Rs 380 ($51) and FP+WS+CC and FP+CC were Rs 550 ($73) and Rs 598 ($80) respectively (Table V.A.3).

3. The number of contacts required to gain a new acceptor was highest in the FP-Ed group, ranging from 8 in its first year, to 46 at the close of the project. The number of contacts per acceptor in the other groups reached a level between 10 and 17 in their third year of service. Follow-up contacts to maintain a continuing user were very similar in all groups (Table V.A.4).

4. The time spent on family planning followed the above cost relationships fairly closely, with the greatest amount of direct family planning time per acceptor or user being allocated in the FP-Ed villages, while the FP+WS+CC family health workers allocated the least time (Table V.A.5).

5. Costs for preacceptance family planning contacts were 3-4 times greater than follow-up contacts (Text page III.D.11). If the latter are considered to be crucial in maintaining use of family planning then programs with limited resources may want to shift some emphasis in the balance of activities from motivation to follow-up.

6. When adjustments or shifts were made in work patterns or functional job relationships these were accommodated most readily in FP+WS. The FP+WS+CC family health workers were least flexible in their ability to adjust, probably because of their overall higher work load (Tables III.A.1 - III.A.21).

7. In FP+WS+CC, with the greatest work load, the proportion of time devoted to direct services was highest. This suggests that integrated services have a greater likelihood of making efficient use of manpower resources (Tables III.A.22 - III.A.28).

8. Similarly in relating costs to services it became evident that supportive costs as distinct from direct service costs were essentially the same regardless of the service pattern. Therefore, within the setting of this project the more direct services that were provided the more efficient was the use of back-up costs and activities (Tables III.D.1 - III.D.10).

9. The overall costs of the Narangwal project services were several times greater than the government primary health center costs had been when we had measured them in 1968 (Table III.D.14). However, because of the greater number of services provided the cost per unit of service was lower for most services in the Narangwal project and this was without taking into account the inflation that had occurred in the interim (Table III.D.14).

10. Nutritional supplementation made up about one-fourth of the total costs of child care, even with the procedures that we developed for focussing supplementation on children who were faltering in weight gain. However, the effectiveness of nutrition in contributing to one-three year mortality decline shows that it is a cost/effective component of health services (Tables III.D.-III.D.10, IV.D.3).

11. Similarly in infection control villages the most effective combination of services for children under one year was immunizations and early diagnosis and treatment. The latter is important because the most important infections were common diarrhea and pneumonia which can be readily and safely treated early by auxiliaries to prevent progression (Table IV.D.3).

12. A primary goal of the project was to design low cost rural services and this required a major emphasis on seeing how much responsibility could safely be turned over to family health workers who provided primary care in curative, preventive and family planning services. It was evident that they capably handled the work load as indicated by the following measures: the overall ratio of services provided as indicated by time spent in direct service contacts by FHWs as compared with doctors was about 10 to 1; the ratio of the number of service contacts for illness care by FHWs as compared with doctors ranged from approximately 10 to 1, to 20 to 1 depending on the type of service. As the project progressed FHWs were able to take on increasing responsibility and they consistently provided good quality services (Tables III.B.1 - III.B.6).

13. The project has demonstrated that effective health and family planning services do not need to be expensive. Even in the villages with combined services (FP+WS+CC) the annual per capita cost was between $1 and $2 (Tables III.D.1 - III.D.10).

SECTION I

INTRODUCTION AND BACKGROUND

A. BACKGROUND OF RELATIONSHIPS BETWEEN HEALTH, POPULATION AND NUTRITION

The Narangwal Population Project explored some basic interactions between health, population growth and development. Two-thirds of the world's population continue to face the uncertainties associated with poverty, poor health and rapid population growth. Even the most remote rural communities now know that a better quality of life is possible. Inadequate understanding of the process of development and its balance with the rate of population growth frustrates efforts to meet these rising expectations. It is evident that simple and straightforward approaches to promoting family planning have made some contributions but now more knowledge is needed to guide long term program decisions.

In the years since Independence the accelerating tempo of change in India has led to numerous pronouncements of determination to give highest priority to welfare objectives. It has become evident that economic development cannot automatically produce a trickle down of benefit for the rural poor. There has been increasing political concern about direct action to achieve a better quality of life for all the people. These goals go beyond a long deferred attention to distributive justice for moral reasons. It has become evident that any country's social and economic progress and its political order require strong measures to reduce the growing disparities between rich and poor.

A long term goal of this research has been to contribute to understanding of whether combined services for health, family planning and nutrition can serve as an entering wedge in the process of development. In efforts to define social development, health and nutritional indices have always been among the first that are listed as being reasonable goals for change. In poor societies the health of children and their mothers uniformally rank high among the components of an improved quality of life.

As economic and social conditions improve, one of the first things that parents do with their new resources is to protect the health of their children and of themselves. This natural process is responsible for the rapid and inexorable fall in mortality whenever socioeconomic development occurs, even when industrialization exploits some groups. Centuries of social effort and scientific research have led to dramatic advances in the means to achieve

reductions of mortality and morbidity.

Unfortunately, an intrinsic gravitational force within the health professions combined with the material rewards to be gained from providing medical care for the wealthy or the political elite leads to medical obsession with a falacious definition of good quality of care. It has become almost reflexive to equate expensiveness with good quality and elaborate institutions with excellence. In diagnosis the search for the rare and exotic provides much greater intellectual challenge and prestige than recognition of the common and every day problems of most people. In therapy the most complicated equipment and refined techniques are demanded regardless of expense. Securing the last few percentage points of possible benefit for the relatively few patients who make it to the apex of the clinical care systems takes precedence and in the process, cost/effective measures to achieve the greatest good for the greatest number are disregarded. Preventive measures are given less attention because of their deferred benefits. Family planning and nutrition are among the most effective long term health measures but they are not easily integrated with health care because personnel are so busy with curative services. A rationalized health care system must obviously attempt to correct these imbalances.

A great deal of evidence has been accumulated to show that high fertility and short birth intervals are extremely damaging to the health of mothers and children under the nutritional and environmental limitations of most developing countries. The influences of health on population growth are much more complicated. The obvious direct effect of better health is to reduce mortality while fertility remains high leading to population increase. On the other hand, a group of factors need to be tested which suggest that health services may directly and indirectly promote family planning.

Several different arguments can be presented in support of this position:

The first is program efficiency and effectiveness. There are obvious organizational benefits to be obtained by combining health and family planning services. If integrated services are provided then the maximum and most effective use can be made of available supplies, equipment, transportation facilities, personnel and organizational structure.

Second, integrated services make more sense to families. When a health or family planning worker visits homes, parents like to have multiple problems cared for rather than being put off by classifications of personnel which they do not understand. In a clinic also, they would prefer to get their care from one person rather than a sequence of people.

Third, many family planning services have had minimal impact because of their inability to provide adequate follow-up to acceptors. An effective and rational follow-up service can be most readily developed in conjunction with other health care services.

The fourth and perhaps the most important consideration is that there are major benefits to be achieved by relating activities for which the public demand is equivocal to care programs which are spontaneously and continuously in much demand. Even though some families are eager for family planning because they have more children than they can care for, in general the much larger number of low parity parents who are demographically most important will continue to be somewhat ambivalent in their motivation. For these parents it seems important to have a convincing case made for early spacing by a health worker whom they have learned to trust because he or she has provided continuing help for day-to-day illnesses.

Fifth, integrated programs provide greater diversity of responsibility and, therefore, more challenge to field workers. The deadening effect of doing only repetitive routines can make it hard to maintain the motivation that leads to good quality service. It is a great help to have some diversity and favorable response from the people to at least part of ones activities. Health workers are, however, not usually spontaneously interested in family planning and specific routines need to be clearly established and balanced to ensure appropriate high priority and continuing attention.

A sixth reason is that family planning has been shown to be especially effective when provided as a routine part of postpartum care because of high motivation at that time. When a gradual process of education is started during the prenatal care period, the mother accepts as perfectly natural the proposition that family planning should be started after delivery both to protect her own health and the well being of her child. Follow-up then is part of the normal care routine. The reasons for high motivation at this

time are not hard to identify. In addition to the health arguments, there are social, economic and time considerations relating to the difficulties parents would have in caring for the children they now have if another pregnancy supervened. In addition, there seems to be an important psychological consideration, having just passed through one pregnancy, mothers tend to want a period of respite before again becoming pregnant.

Finally, there is the open question of the effect of child survival which is one of the main hypotheses which this project was set up to test. There is much uncertainty about the proposition that the experience and/or expectation of infant and child mortality may hinder significant movement toward lower fertility in much of the developing world. According to this view, as long as the proportion of children who die in childhood remains substantial, there is a major psychological obstacle to be overcome in promoting family limitation.

Thus, significant reduction in child mortality may be an important although perhaps not essential means of encouraging a decrease in fertility in areas where both fertility and mortality are high. It would be expected then that efforts directed specifically toward the reduction of child loss and especially toward increasing the perception of greater child survival although not guaranteeing fertility decline, could shorten the demographically important lag between the decline of mortality and fertility rates.

Possible reasons for such attitudinal interrelationships are readily mobilized. Children, and especially sons, are seen as a source of support in old age. The status of women in some cultures depends on whether she produces sons, and in almost all cultures many of the satisfactions of family life derive from having children around as long as possible. Ensuring a replacement number of children depends on the balance between reproduction and survival, and in terms of emotional investment there is probably more concern with the latter than the former.

If child survival influences motivation to family planning it probably operates differently at various stages of development and in the context of other forces influencing fertility attitudes. During famines or when conditions are temporarily bad parents may just defer child bearing. Also when conditions have improved sufficiently so that subconscious expectations

of survival are high then intermittent mortality changes probably have little effect. The maximum interaction would be expected during the period when death rates have fallen and birth rates are still high which is, of course, the period when population growth is most rapid.

The most direct means of lowering fertility is to promote the practice of family planning. A rapidly increasing body of theory has been developed to define the variables influencing population growth (Easterlin 1974). These include: educational level, role and occupational opportunities for women, the economic value of children, the attitude toward planning for the future, etc.

It is important to begin to measure the relative strength of these factors in comparative terms. While trying to take into account some of these background variables our particular interest was to define potential mechanisms by which combinations of health, family planning and nutrition might reduce the rate of population growth by shortening the lag between a decline in mortality and a drop in fertility. The broad goal of this research, therefore, was to see whether and how much particular groups of health measures would promote greater and more effective practice of family planning.

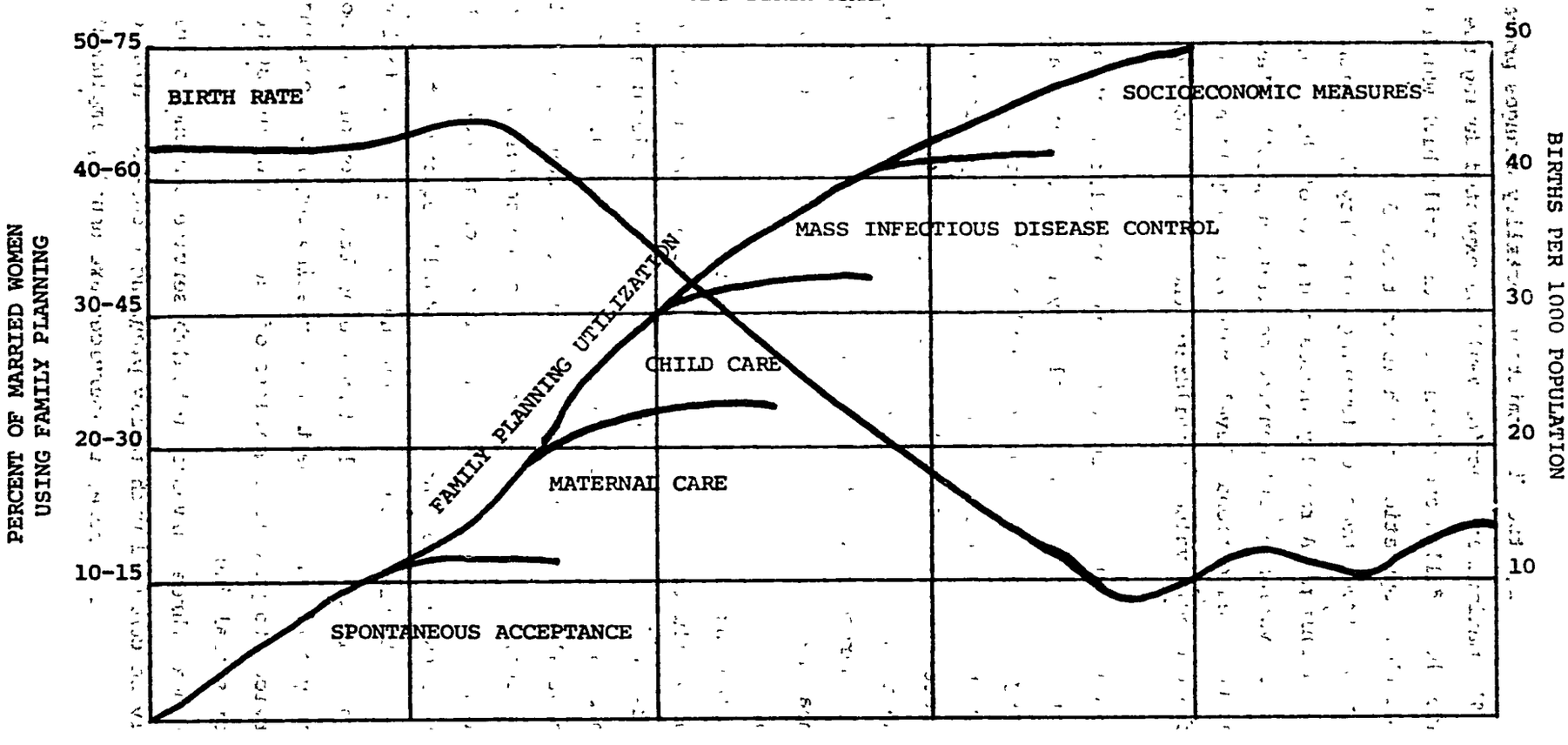
In planning this research, we set out to test a simple diagrammatic model which illustrates some of these relationships among program planning components (Figure I.A.1). Increments in family planning utilization over time can be shown as a series of curves, each reaching its own plateau level. For conceptual clarity the steps are separated sequentially although in actuality they must overlap. Local variation determines the strength of motivation associated with each program component, but for schematic purposes all increments are shown as being essentially equivalent.

The first curve shows the spontaneous acceptors of family planning who are parents already overwhelmed by the health, economic, or both problems of too many children. To meet such existing demand, providing family planning services to parents regardless of race or economic status is simply a matter of social justice.

The next three curves show health service components which can most logically be combined with family planning programs. Although the curves are shown separately here, the services are usually implemented in some

Figure I.A.1

MODEL OF INTERACTIONS BETWEEN FACTORS INFLUENCING FAMILY PLANNING UTILIZATION AND BIRTH RATE



locally determined combination having a synergistic interaction. Successive increments in family planning utilization can be expected from integration with maternal care, child care, and control programs for mass, epidemic and endemic infections. For the greatest efficiency of personnel use, female methods of contraception can be combined with maternal and child care. Male methods can be combined with infectious disease control programs which include home visiting for surveillance; these visits can be used to provide family planning education and services to men.

Experience in the more rapidly developing countries suggest that where health conditions are already fairly good, family planning acceptance may rise rapidly to a relatively high level rather than plateauing at lower levels. The cumulative effect of combined health services and family planning then can interact spontaneously to bring birth rates down.

The next two family planning utilization curves show the effects of economic measures and sociocultural changes which presumably become most effective as development advances. Economic measures are probably more manipulable than sociocultural variables which require education and a change in values. Pronatalist measures should be removed and abortion legislation modified as early as possible. On the other hand, political sensitivity usually dictates cautious implementation of population control proposals that involve specifically antinatalist legal, social, or economic constraints or incentives.

1. Specific Objectives

This research project had to accommodate two parallel sets of research objectives. Of greatest importance to the health and family planning services of India was a very pragmatic question related to the development of services. The Indian government had already made a general policy decision to integrate family planning and maternal and child (MCH) services, even though the major program thrust was rapid expansion of family planning, especially sterilizations. The main concern was how continuing services could be developed within their severe economic and administrative constraints. To provide practical information we developed an evolutionary approach starting with careful initial planning of service program packages and

proceeding through a series of steps contributing to their progressive improvement. A combination of selective measurements with rapid feedback of the best experience of field workers led to continuing modification of service activities. A major effort was to ensure a quick cycling of information and changes in field routines so that modifications could be systematically refined. For the most part, this involved sequential testing in cost/effectiveness terms of many different methods of providing services.

The second stream of research was much more basic in its orientation. Certain hypotheses were defined and a careful experimental design was developed to test these. Because the research was based in the natural setting of village populations there was little that was artificial or theoretical in the field trials, since a primary responsibility was that everything tested should eventually be applicable to practical programs within Indian conditions. The specific packages of services referred to in the first objective were provided to groups of villages as inputs, detailed measurements were made of the outputs in terms of utilization of health and family planning services, and then outcomes were measured in both health and fertility parameters. This type of input-output-outcome design lends itself particularly to eventual complex multivariate analyses that provide a quantitative base for cost/effectiveness and cost/benefit judgements.

The specific objectives that were built into the hypotheses and experimental design as they were developed at the start of this research are as follows.

a. Objectives

1) Main Objectives

a) To test in an experimental field situation hypotheses related to the effect that the delivery of combined health and family planning services will have on family planning attitudes, acceptance and practice (see hypotheses below).

b) To develop an effective model of combined health and family planning services that could serve as a prototype for rural demonstration projects and ultimately provide a basis for wide spread application in government health services.

These aims are not mutually exclusive since the service models that have been evolved provide the service inputs for testing the hypotheses of the experimental design.

2) Additional Objectives

a) To conduct research on the epidemiology of reproduction and conditions determining the effective use and complications associated with specific contraceptive methods.

b) To analyze the effect of changing economic expectations and other possible motivating factors on family planning practice.

c) To further refine methods of measuring inputs of service programs and to relate these input measurements to the outputs and outcomes of the service programs by using functional analysis techniques.

b. Hypotheses

The general hypothesis being tested in the present research program is that attitudes towards and acceptance and practice of family planning will improve when it is combined with the provision of health services.

The research design tests four specific sub-hypotheses under this general hypothesis:

1) Contraceptive practice will be greater if family planning services (FP) are combined with general health services for women aged 15-49 (WS) than if FP is provided alone.

2) Contraceptive practice will also be greater if FP service is combined with health services for children aged 0-3 (CC), than if FP is provided alone.

3) Contraceptive practice will again be greater if FP is combined with both WS and CC, and this combination will produce an increment in FP practice greater than the sum of effects observed under hypotheses 1) and 2).

4) A decline in infant-child mortality will lead to increased contraceptive practice because an increased expectation of child

survival will result in a decrease in the number of births desired by parents, but there will be a significant lag period before these interactions can be measured.

2. Origins of the Narangwal Research Project

The Narangwal Population Project grew out of prolonged and intimate involvement in the life and problems of village India. Members of the staff have spent many years living and working in villages. A deep empathy with the realities of village life was ensured by the fact that the Rural Health Research Center (RHRC) was located in two adjacent villages of 1,800 and 800 population (Bara,"Big",Narangwal and Chota,"Little",Narangwal). All members of the research staff lived in Narangwal or the villages where they worked. Hygienic improvements were made to demonstrate healthful living. The fact that our staff families were part of the villages provided maximum opportunities to exchange ideas and get informal feedback about programs and ideas. There is a depth of understanding which comes from sharing the life of villagers which cannot be matched by sophisticated data gathering.

The more formal origins of the population project derive from the specific sequence of research activities which had been undertaken at the Narangwal Rural Health Research Center. The first project at RHRC in 1961 was an in-depth study of the rural orientation of physicians. Indian social scientists lived in the teaching health centers of seven medical colleges distributed all over India to make five years of observations. They administered an extensive battery of tests and questionnaires at the beginning and end of the two to three month rural internship which is the first period during which Indian doctors are required to live in rural areas. This led to a series of studies on indigenous practitioners and the beliefs of village people about diet and disease. Because it became increasingly evident that it was important to study the whole health team a series of research projects were undertaken to develop a functional analysis methodology for measuring both needs and resources of primary care services in the same functional terms and to work out ways of optimizing roles and relationships within the health team.

On the basis of this background information two action research projects were started on the two health problems which seemed most important in village

India. One was the Narangwal population study reported here. The other was a similar in-depth analysis of the interactions between malnutrition and infections in weaning-age children. The nutrition project included all children under three years of age in four groups of villages. One group averaging about 190 children received nutritional supplement alone. A second group averaging about 170 children was provided infection control through immunizations and early diagnosis and treatment. The third group averaging about 340 children received both nutrition and infection control measures (combined service group). The fourth group of about 420 children served as a control. It was demonstrated that mortality rates were lowered most significantly in the combined service group in comparison with the controls; reductions being 23 percent for infant deaths, 67 percent for deaths of children 1 to 3 years of age, and 39 percent for children 3 to 5 years of age. The average three year old weighed approximately 700 grams more in villages receiving nutrition supplementation than in control villages. Differences in height peaked at 2 years of age when children in villages with nutrition programs attained a height on the average 2 cm greater than those in the controls. These impressive results were obtained using primary care auxiliaries. The nutrition and population projects were developed together and one group of villages was included in both projects serving as the comprehensive care group combining nutritional supplementation and infection control in the nutrition project and also serving as the child care and family planning group of villages in the population project.

Finally, the immediate initiative for this research came from the Government of India, Ministry of Health and Family Planning. At Narangwal RHRC we had a series of annual conferences which were attended by senior officials of the central and state governments and leaders in medical education. At these conferences research findings were presented to be interpreted by those who would be most involved in implementation. This ensured that the research would be practical. At a Conference in 1965 the Health Minister, Dr. Sushila Nayar requested that we undertake research on the integration of health and family planning. It was evident in the national program that the thrust of the various categorical approaches to family planning would eventually plateau in their impact and that some long term development of a

more comprehensive approach would be needed. The Ministry of Health delegated responsibility for the oversight and surveillance of the Narangwal project to the Indian Council of Medical Research so that it became part of the ongoing Indian national research effort. Annual reports were made to the ICMR so that the research could be kept in line with national objectives. Direct communications were also maintained with officials in the Ministry of Health and Family Planning and there were numerous site visits to Narangwal throughout the course of the research. The original funding was from a PL-480 grant from the U.S. Department of Health, Education and Welfare for feasibility observations. The project was greatly expanded with long term financing from AID. Funds were also contributed by the World Health Organization (H9/181/22 and H9/181/23). Finally, the most important, the commitment of the Indian government to this research was indicated by their providing direct research grants from ICMR after the PL-480 grant was terminated.

3. Other Research on These Subjects

When the Narangwal Population Project was started only a handful of previous action research projects had attempted to define the background factors which influence the success or failure of family planning programs. There had of course been many observational and survey studies and also many reports of evaluations of field programs.

The most notable example in India was the Khanna Project which was conducted in Ludhiana District in the Punjab some ten years previously (Wyon and Gordon 1968). Khanna is 26 miles from Narangwal. One of our research team had been involved in setting up the Khanna project but not in its analysis or write-up and, therefore, it was natural that there should be a great deal of carry over of lessons from the Khanna experience. The Khanna project objectives were broadly to contribute to understanding of the dynamics of factors influencing fertility and in this they succeeded in making major contributions. There were some major differences in design from Narangwal. The Khanna action program included only one family planning method (foam tablets). The expected demographic impact on the population was to have been measured between a study group of villages and two groups of controls, one of which was followed closely and one which had a minimum

of contact with project personnel. Contrary to the erroneous impression given in a book by Mamdani (1973), the project personnel realized early that the original expectations of achieving significant family planning utilization were not being met. No one was more aware of the complexities of the issues than the project personnel who lived in these villages for four to six years. The most important result in the analysis of Khanna project data was that the lack of demographic impact led to in-depth exploration of many important questions related to the broad goal of improving understanding. Some of these were: the epidemiology of fertility and of lactational amenorrhea, birth interval dynamics, fetal wastage, the influence of marriage patterns and especially delayed age of marriage, differential age at menopause, childbirth practices, causes of death in the rural Punjab, accidents, weanling diarrhea and neonatal tetanus. The general decline in fertility during the four years of the study period was attributed mainly to increasing age at marriage while the major factor limiting fertility was thought to be prolonged lactational amenorrhea. A rank ordering was provided of factors which were thought to be important in maintaining fertility including: high risk of losing children, ignorance of birth control, early age of cohabitation, no occupations for women outside the home, high marriage rates and low status of women, reduced breast feeding, acceptance of low standard of living, need for sons, and a variety of political and economic reasons.

Another action research project was carried out in India at the Singur teaching health center of the All India Institute of Hygiene and Public Health in Calcutta (Population Council 1963). A broader range of contraceptive methods was offered. Initial reports indicated a fall of birth rates in four years from 45/1000 to 37/1000 in the test area and 43/1000 in the control area. Subsequently the birth rate of the control area dropped to equivalent levels. There was no deliberate effort in this project to integrate family planning with health activities. However, the Singur villages had received intensive health care services since the early 1940's and had been saturated by repeated health surveys and intensive health education program.

At Narangwal an attempt was made to separate the impact of the various components of health services and their effect on family planning utilization.

This involved separating out the effects of maternal services from child care. There was abundant reason to think that a rural postpartum program would influence family planning utilization just as urban hospital based postpartum programs had been shown to be effective in promoting family planning (Zatuchni 1970). There were numerous good reasons why family planning could be made part of maternal care. However, inadequate demonstration and little documentation was available to show that such programs would be effective in rural areas.

The situation was even more murky in relation to combining child care with family planning. Research findings were almost non-existent.

According to the child survival hypothesis improved child survival would contribute to increased family planning motivation and consequent fertility decline. From our earlier work in Punjab villages it was evident that the effect is not automatic and probably not a necessary precondition for fertility decline. There does not seem to be a reflexive one-to-one replacement, but a partial effect may still be important. In the clearly demonstrated reduction in interpregnancy intervals after a child death, the major component is undoubtedly the removal of the biological protection of lactational amenorrhea. Separate but somewhat smaller reductions in birth intervals after child death have been shown to occur in situations where lactation could not have been the explanation (Taylor et al, 1975-76).

It is expected that increased child survival will contribute to fertility decline mainly in countries experiencing rapid mortality decline and population growth. The replacement of children who die is probably not so much "volitional" as a result of alterations in subconscious expectations. It is apparent that in a traditional agrarian population, few direct and manipulable means of influencing motivation for fertility limitation are available, and therefore it may be that integrated health and family planning programs provide opportunities for immediate program development. By making parents aware of improved chances of survival through health services in which they develop confidence, the spontaneous linkages between mortality and fertility can presumably be reinforced.

4. Background Information About the Punjab

Repeatedly during the course of this research we have been asked why this project was set up in the Punjab. Would it not have been better to have done the work in a place such as Bihar where the results would have been more convincing?

The first answer to this question is that when the project was originally planned there seemed to be good reasons to select a place where the chances of success would be maximized. There were many uncertainties growing out of the backlash from the mass IUD programs. Other pilot projects had produced equivocal results or had been based on well established health center programs in places such as Singur and Gandhigram. We had been working in the Ludhiana area and had a good administrative and cultural base even though we planned to work in a completely new group of villages.

We planned from the beginning to move from an initial research approach to a series of demonstration and training projects in the poorest parts of India.

Finally, a justification for being in the Punjab that emerged after the Green Revolution produced greater affluence was that experience there was instructive just because the area was developing rapidly. It provided lessons for patterns of development that would presumably become general in India as developmental change spread in the new few years.

For those who have not been to the Punjab recently, it is hard to understand the tremendous transformations that have occurred in the last fifteen years. The reality of the Green Revolution is that doubling and tripling of agricultural production has brought considerable economic influence even to the poorer who have been able to make their own economic gains because of labor shortages. The availability of money has changed the appearance of the villages. Brick is replacing mud as the standard building material. Electrification has brought labor saving devices and the radio which has shattered the peaceful quiet of village life. The paving of village streets has eliminated the need for reflexive agility in maneuvering past mud holes and has encouraged village cooperation. The availability of cash led to a quick response from merchants who first came through the villages with their wares on bicycles and then set up shops. The introduction of agricultural implements

was, in some instances, forced as a response to greater work pressure and in order to handle the larger crops. For instance, the first harvest after the new strains of high yielding wheat were introduced showed such an increase that possibly as much as half of the crop was lost in some areas because it was impossible to get the grain harvested before the monsoons. It was obvious that the traditional methods of using oxen to stamp out the grain and winnowing by throwing the grain in the air for the wind to blow out the chaff could never meet the new challenge. In one year a remarkable shift to mechanized but simple machine threshing occurred.

Education has also expanded rapidly. There are now primary schools for girls and for boys in every village. Within a few miles there is a high school available to each village. Increasing numbers of rural colleges are also being started at the initiative of the village people because education has become very highly prized. Likewise, the rapid spread of paved roads to almost all villages has brought public and private transportation by bus and bicycle. The growing literacy carries with it an increasing availability of written material such as newspapers and magazines.

The Punjab has always been the scene of tremendous political activity. This has become particularly important because of varying opinions on the distribution of services and development priorities. Village politics are now related to state issues especially because of the great influence by the panchayats and other local government officials.

5. Population Project Report

a. The Villages of the Narangwal Study Area

The Narangwal Rural Health Research Center was established in collabortation with a teaching health center of the Ludhiana Christian Medical College. The health center was started in 1955 to provide a base for rural internship training. The Rural Health Research Center was started in 1961 with an exclusive focus on field research.

The Teaching Health Center has a beautifully designed and excellently equipped 25 bed facility in the Bhagwant Memorial Hospital. The in-patient facility is supported by a delivery room and small surgical unit, laboratory and small x-ray facility. In addition, there are ambulatory care facilities

and provisions for housing and accommodations for an active teaching program for doctors and nurses. These facilities had been donated by Sardar Prahlad Singh Grewal, a Narangwal resident who became a mahagony exporter in East Africa and built the health center as a memorial to his son. An active outreach program with home visiting and community teaching has been carried out in the six villages adjacent to Narangwal with a total population of about 10,000. None of these villages were included in any of the research activities to be described and there was minimal influence on the study or control villages.

The Government Health Services are based on primary health centers (PHC). Each government PHC serves one community development block of between 80,000 and 100,000 population. Narangwal village itself is situated in Pakhowal Block in the south-central section of Ludhiana District. In order to get geographical distribution, with sufficient distance separating the groups of villages in the experimental groups of the research design, a careful selection process resulted in our 26 experimental villages being scattered through three adjacent community development blocks.

Narangwal village served as the project headquarters. Village accommodations were converted to provide office space and facilities for statistical work and simple laboratory services. In addition, other village accommodations were renovated to provide housing for the approximately 100 people on the central project staff. Most of the remaining staff members lived in village accommodations in the study villages. The approximately 2,600 residents of the two parts of Narangwal village accommodated the presence of our project staff with true Punjabi cordiality and hospitality. The warmth of the personal friendships and the genuine fellowship of being completely accepted as part of the village community remains as a much cherished memory for everyone who participated in RHRC activities. We learned much from our village neighbors and this helped in interpreting research findings. We are convinced that one of the greatest strengths of the Narangwal research was that we all participated so intimately in village life.

Punjab villages are cohesive social units, each of which has its own history and village personality. In addition, groups of villages tend to be geographically pocketed with local affiliations based on the clans of the

dominant Jat Sikh caste. Since we selected our groups of villages so as to have those in one group adjacent to each other but separated from other groups we encountered unexpected problems in trying to achieve comparability between experimental groups. In selection all of the usual definable and quantifiable parameters were taken into consideration but there were still major differences in important variables such as caste distribution. We also realized that lack of homogeneity in the more subtle but ultimately more important characteristics that relate to issues such as relative conservatism or willingness to change would be impossible to balance in the village selection. It was only after the field work began that we realized how different the responses were in various villages, and between groups of villages.

A feature of the internal structure of Punjabi villages needs to be mentioned. Horizontal stratification in the village is provided by the well recognized caste structure. Just as important in functional terms is the vertical stratification into hereditary pattis or factions. There are two to three factions in every village based mainly on family groupings of the land owning Jat Sikhs. These cut across caste lines by including the traditional jajmani or occupational affiliations of families from the service castes. Village decisions are made by political maneuvering and occasional violence between the pattis. This makes cohesive decision making difficult.

Another cultural characteristic that proved tremendously important to our family planning research was the fact that this area has a long established pattern of village exogamy. All girls marry outside the village but within appropriate caste and patti affiliations. This was important to our research because of the cultural practice that for the first several deliveries women go home to their parents. The complexities that this introduced into vital statistics reporting were intricate and tremendously time consuming. The fact that well over a third of our births occurred in villages where we had no personnel meant that we had to set up elaborate mechanisms for recording incoming and outgoing births. In addition since women typically go to their parents' homes two to three months before delivery and stay up to three to four months after delivery, there was considerable difficulty in getting complete reporting of pregnancy wastage and neonatal and infant mortality. From the service point of view it also became extremely difficult to provide good delivery services and follow-up of family planning.

A major feature of this research was our effort to involve village people in both planning and implementation. Preliminary negotiations were conducted with panchayats, or elected village councils. It proved relatively easy to get understanding and concurrence with the notion of an experimental design in which different packages of services were to be offered to various villages. In any case, our services were to be additive to those provided by the government primary health center. Villagers were already used to what seemed to them incomprehensible selectivity of particular activities in the government's categorical programs. It was widely recognized that the government policy was to provide intensive care to the 5,000 population immediately adjacent to the PHC. For ethical reasons, we decided that control villages, and those villages receiving only partial services should be within the intensive areas of PHC's. It became evident as the study progressed that this diluted considerably the usefulness of our controls because the main activity of the PHC's was family planning.

Community participation in the research and service effort ranged through many kinds of activities. In the first place, an initial problem was to ensure the safety of the young ladies who were employed as family health workers. An excellent solution evolved when panchayat members volunteered to make official and public statements that they were adopting the family health worker as a daughter of the village. This was enforced by wide publicity given to a few initial episodes in which young men were publicly chastised for making questionable remarks about family health workers (FHW). Village panchayats also agreed to provide accommodations for subcenters and FHW residences. In fact, a salutory competition developed between two villages trying to build a better subcenter than their neighboring village. In villages where nutritional supplements were provided a beginning was made in successful efforts to get panchayats to collect food from farmers at harvest time which was stored for the nutritional supplements at feeding centers.

Even more important than these and other manifestations of tangible support was the steady and continuous moral support provided to project personnel. Discreet and sensitive encouragement was provided when things

became difficult. The wise advice of village people resolved many of our most complicated problems. They were patient and understanding of the cultural mistakes and inadvertent discourtesies that intruded in relationships with the few foreigners on the project and those Indian staff members who came from urban areas and other parts of India.

b. General Approach to Planning the Project

Preparatory thinking leading to this project went on over a period of at least ten years. Several different types of surveys and preliminary research efforts were conducted to clarify background issues and hypotheses. We owe a great debt of gratitude to the Khana project for its pioneering of this kind of field research (Wyon and Gordon 1971). The several previous research projects at the Rural Health Research Center meant that our staff had been intimately associated with the practical development of rural health and family planning services in government programs.

We developed some strong convictions about the ethics of research in community medicine which relate especially to the need for ensuring that the rights of village people take precedence over everything else. The first of these rights is that they must be involved in the planning and implementation of field work. From long association with village people and involvement in providing them with services it also became evident that traditional spontaneous approaches of haphazard service development are totally inadequate to meet today's rapidly changing and growing needs. Tremendously excelerated research is needed to find practical and workable low cost methods.

c. Applied Research on Development of Services

The Government of India's major interest in this research project was in the objective of trying to develop a new pattern of services combining family planning, women's services and child care. Perceptive officials had already decided that they had gone about as far as they would be able to with an intensive single purpose national program for family planning. As a result of massive investment of funds there had been very large and successful sterilization camps for both vasectomy and tubectomy. It was apparent that the mass approach to inserting IUD's also on a camp basis

had produced a serious backlash. After a very successful initial wave of acceptance, especially in the Punjab, it was found that more women were having their IUDs removed than there were new cases being recruited for insertion. As more pressures and incentives were applied the more negative the general reaction became. This negative feeling about the precipitate and overly aggressive implementation of IUD programs then carried over to resistance to proceeding with mass implementation of programs to distribute pills. At the time the Narangwal population project started it was apparent that it would have been easier to get general acceptance of both IUDs and pills if the massive national IUD program had never been mounted. On the other hand, a favorable effect of the national program, and especially the sterilization program, was that a very high level of general awareness about family planning had been created in even the most remote rural areas.

It was in this context that our discussions with government officials about the pattern of services matured. They were definite about their priorities; they expected us to concentrate on integrated services. The question of whether more family planning utilization would be achieved by programs to provide family planning alone or in combination with health services was not important to them.

Indian government policy has focused on family planning services, on motivation for family planning through mass publicity, and on direct incentives such as cash payments for sterilization. Imaginative proposals for social, legal, and economic population control measures are viewed skeptically in India; it is felt that they reveal an ignorance of the realities of village life. Proposals to withhold pronatalist benefits for large families make no sense in rural India because villagers have essentially no benefits to be withheld. Economic incentives for continuing use of family planning methods other than sterilization create the concern that channeling large sums of money into the villages would require complicated safeguards to ensure that a reasonable fraction gets to the right persons. Only on tea plantations has there been any inclination to try the interesting experimental approach of using educational bonds as incentives (Ridker and Muscat 1973). The workers on these plantations have sufficient employment security to respond to an arrangement under which an educational reserve for children is built up if the numbers are sharply limited.

A beginning is being made in discussions of how to promote the general social objective of improving the status of women and increasing their participation in the paid labor force as a means of reducing fertility. However, social reformers learned long ago that such goals are not easily achieved in rural traditional societies. Much time and effort are required for a village woman to care for a home and family under subsistence conditions. Experience thus far suggests that this and other similar highly desirable changes will follow rather than serve as entering wedges in the development process.

The strongest reason for being wary of direct population measures is because overt actions tend to be politically interpreted. Poor and deprived groups, whether in India or the United States, resent any implications that they are primary targets of family planning programs. The uncertain dynamics of modern nationalism and the shifting political base make local leaders increasingly unwilling to jeopardize their political futures for ideas proposed by experts from developed countries.

d. Experimental Design

The second parallel stream of research in the Narangwal Population Project related to specific hypothesis testing and the development of an experimental design for basic research purposes. To test the hypotheses we decided to have five experimental groups of villages which were matched as closely as possible for comparability. Each group of villages then received a different service package as inputs. Throughout the remainder of this report they will be identified as follows:

Family planning, women's services and child care services (FP+WS+CC)
Family planning and women's services (FP+WS)
Family planning and child care services (FP+CC)
Family planning education (FP-Ed)
Control (CONT-P)

The concurrent nutrition project had four experimental groups of villages which received the following service inputs:

Child care services, nutritional supplementation and infection control (NUT+IDC)

Nutritional supplementation (NUT)

Infection control (IDC)

Control (CONT-N)

One experimental group, overlapped in the two projects, as can be seen in Figure I.A.2 on the next page, that is the FP+CC (family planning and child care group in the population project) and NUT+IDC (child care services with nutritional supplementation and infection control group in the nutrition project). The designation FP+CC will in all instances, therefore, cover this one group of experimental villages.

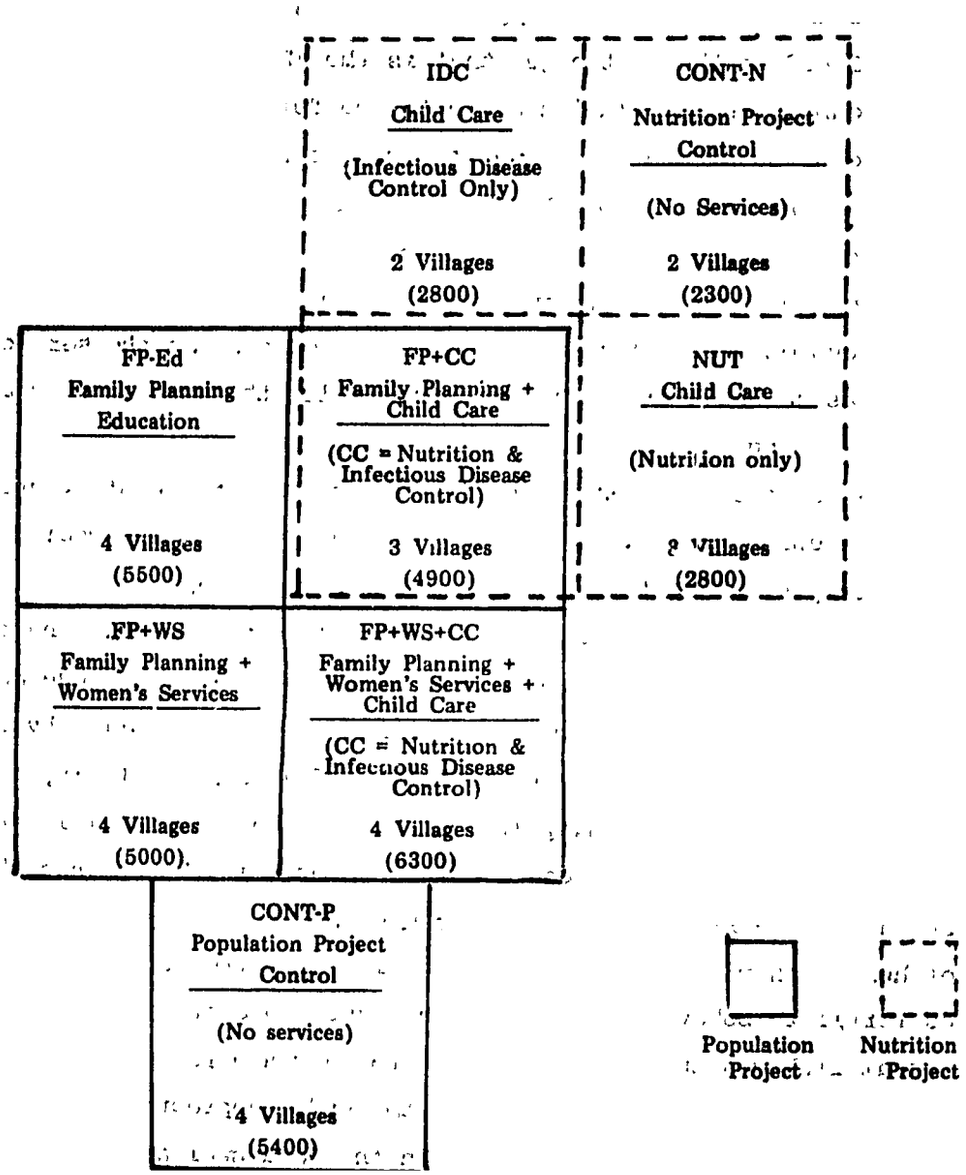
A measurement process was set up to define quantitatively the input into each group, the output in terms of direct changes in the services used by people as a result of the inputs and finally the outcome as measured in eventual change in health and fertility status.

As the services evolved during the course of the study great care was taken to ensure that each activity remained within the specific program category prescribed for that experimental group.

In addition to the direct service-related parameters there were numerous other variables which were measured at the same time. These background variables were chosen because of our interest in specified hypotheses about causal relationships, especially those influencing fertility behavior. Because we measured so many differential potential causal linkages the experimental design provided a unique opportunity to balance the relative strength of various variables. It has long been apparent that few aspects of human behavior have as broad and diverse patterns of multiple causation as fertility behavior. Most studies have concentrated on sharply focused causal linkages but it is then hard to know how to relate a demonstration of the importance of a specific factor under appropriate circumstances to the broader multicausal pattern. In the Narangwal analysis we have had an opportunity to compare relative degrees of importance among variables as part of a beginning attempt to define causal sequences.

Figure I.A.2

EXPERIMENTAL DESIGN OF THE NARANGWAL POPULATION PROJECT IN RELATION TO THE NUTRITION PROJECT



(Population given is for 1972)

Data Collection

The 26 villages in the project had over 35,000 population. The following surveys and studies were carried out systematically in all or selected segments of this population during the time periods indicated below:

Cross-Sectional Surveys

Baseline Census of Population		1967-68	22 villages
Second Census		1971	22 villages
		1972	4 villages
Third Census		1973	26 villages
Pregnancy History and Present Fertility	1st survey	1968-69	22 villages
	2nd survey	1971-72	26 villages
	3rd survey	1974	4 villages
Attitudes and Beliefs About Family Planning and Child Survival	1st survey	1968-69	22 villages
	2nd survey	1971-72	26 villages
	3rd survey	1974	4 villages
Knowledge and Practice of Family Planning	1st survey	1968-69	22 villages
	2nd survey	1971-72	26 villages
	3rd survey	1974	4 villages
Socioeconomic	1st survey	1967-68	22 villages
	2nd survey	1971	22 villages
		1972	4 villages
Health Service Utilization	1st round	1972-73	26 villages
	2nd round	1973-74	19 villages

Longitudinal Data Collection

Family Planning Practice	1969-74	8 villages
	1971-74	3 villages
	1972-74	4 villages
Fertility Status of Eligible Women	1969-74	8 villages
	1971-73	7 villages
Vital Statistics - Births and Deaths	1969-74	22 villages
	1972-74	4 villages
- Marriages	1972-74	26 villages
Morbidity of Children	1968-73	10 villages
Anthropometric Measurement of Children	1968-73	14 villages
Service Records	1969-74	18 villages
	1972-74	4 villages
Work Sampling	1971-72	18 villages
	1973-74	14 villages
Costs	1969-73	7 villages
	1969-74	11 villages
	1972-74	4 villages

Figures I.A.3 through I.A.7 give the approximate dates for these surveys and studies on time lines constructed for each of the experimental groups of the population project. These figures also provide similar information for the service inputs into each group thus giving an overview of all the major activities carried out in the study population during the total duration of the project. Details of the specific services and data collection techniques are described in subsequent sections of this report.

In the original experimental design one group of villages was designated family planning only. In consultation with government officials it became evident that this group was considered redundant since it was felt that the national family planning program had been using the family planning only approach, that this approach had already made its contribution, and that the next important issues were to find out what additional services could be combined with family planning in order to increase utilization by village populations. While the other experimental groups were getting started, we discussed this issue for two years. It was finally agreed that the family planning only group should become the family planning education group with the objective of seeing how much an intensive educational program could increase family planning utilization. As will be described, rather than using family health workers at the village level, the basic field personnel for this group of villages were family planning educators whose basic training was as junior basic teachers (JBT) for village schools.

A particular issue which required a great deal of discussion at a theoretical level before the project started was whether the total personnel input into each village should be matched or whether the input applied to each particular service should be made quivalent. To answer the hypothesis related to the effect of basic qualitative differences in input, we decided to use the former approach of trying to make the total work input into each village equivalent but that the qualitative components of that work would differ. This meant that the equal numbers of village workers assigned to each village were expected to put in essentially equivalent amounts of work but in the family planning education group of villages all of their work was devoted to family planning education whereas in the villages where they were doing either women's services or child care or both proportionately a smaller amount of time would be devoted to family planning.

Figure I.A.3

APPROXIMATE TIME FRAME FOR STUDIES AND SERVICES IN THE FP+WS+CC EXPERIMENTAL GROUP

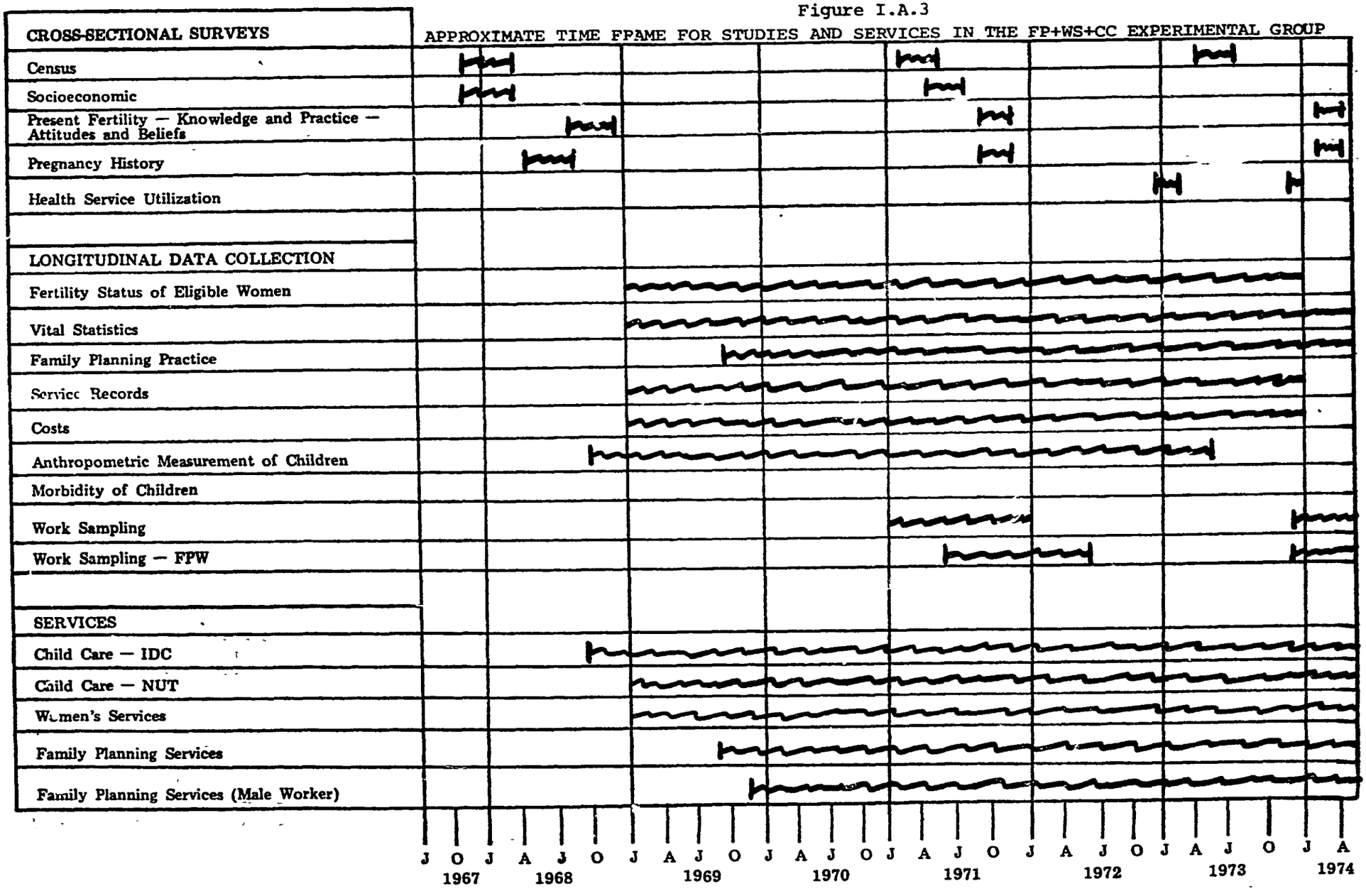


Figure I.A.4

APPROXIMATE TIME FRAME FOR STUDIES AND SERVICES IN THE FP+WS EXPERIMENTAL GROUP

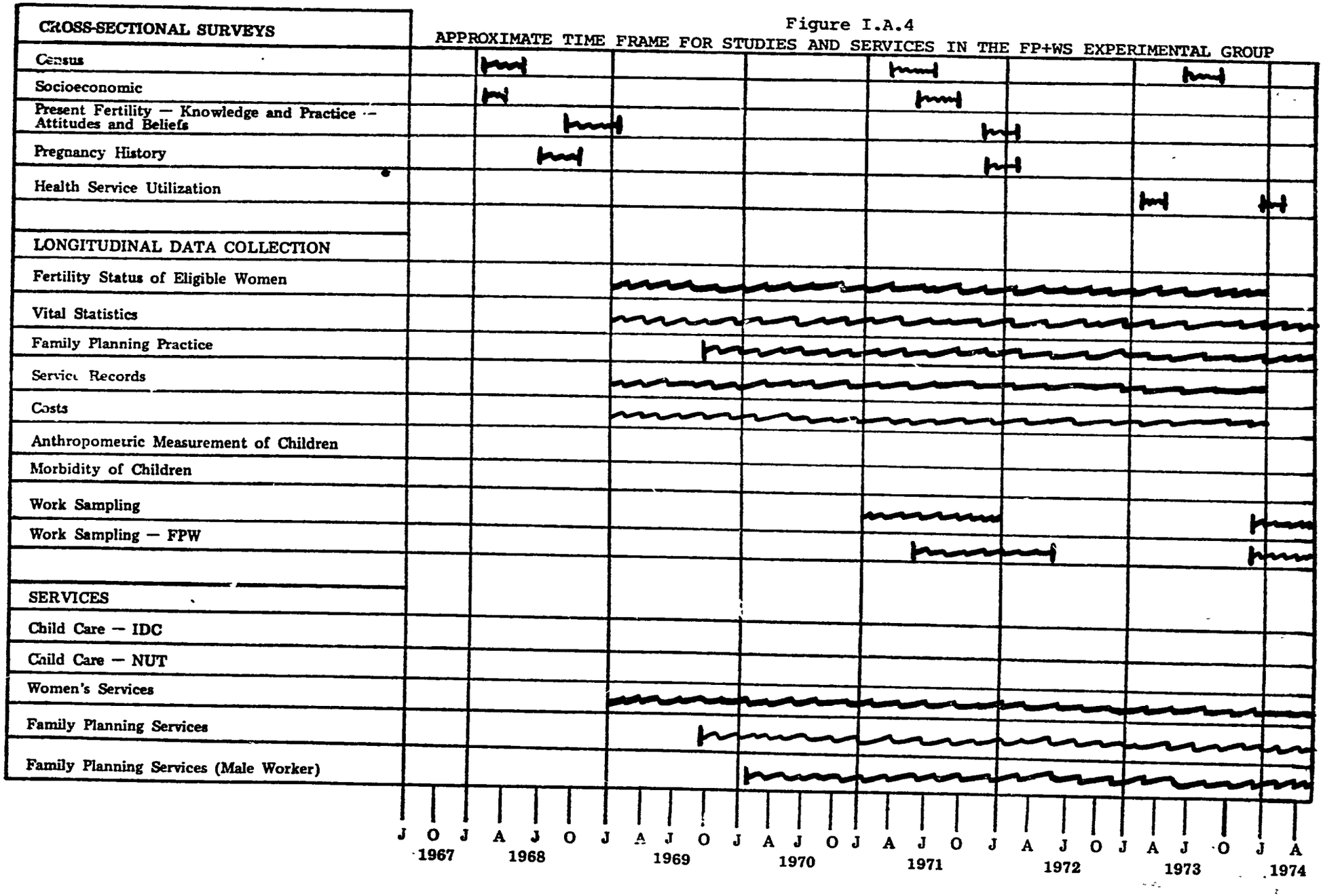


Figure I.A.5

APPROXIMATE TIME FRAME FOR STUDIES AND SERVICES IN THE FP+CC EXPERIMENTAL GROUP

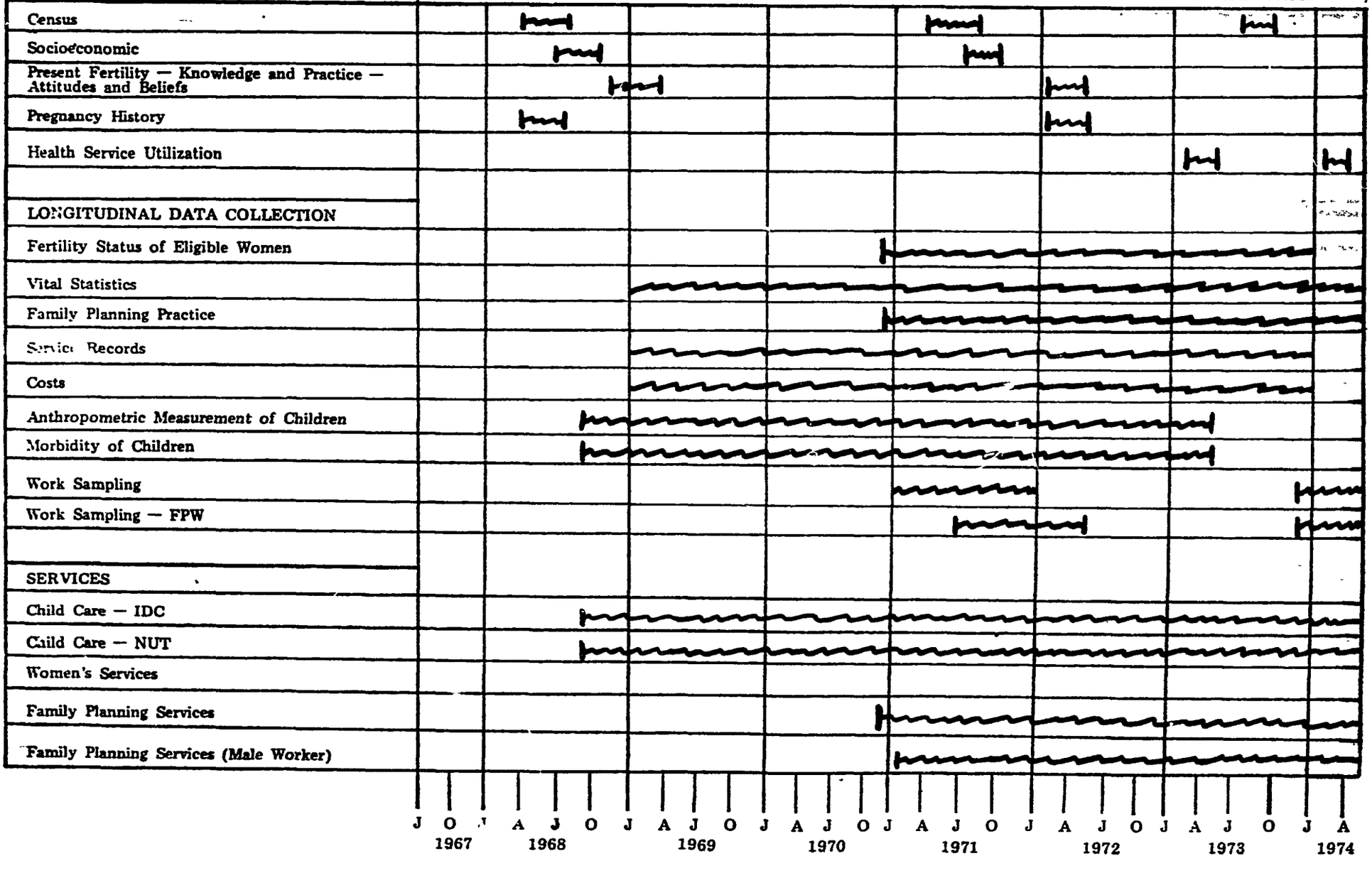


Figure I.A.6

APPROXIMATE TIME FRAME FOR STUDIES AND SERVICES IN THE FP-ED. EXPERIMENTAL GROUP

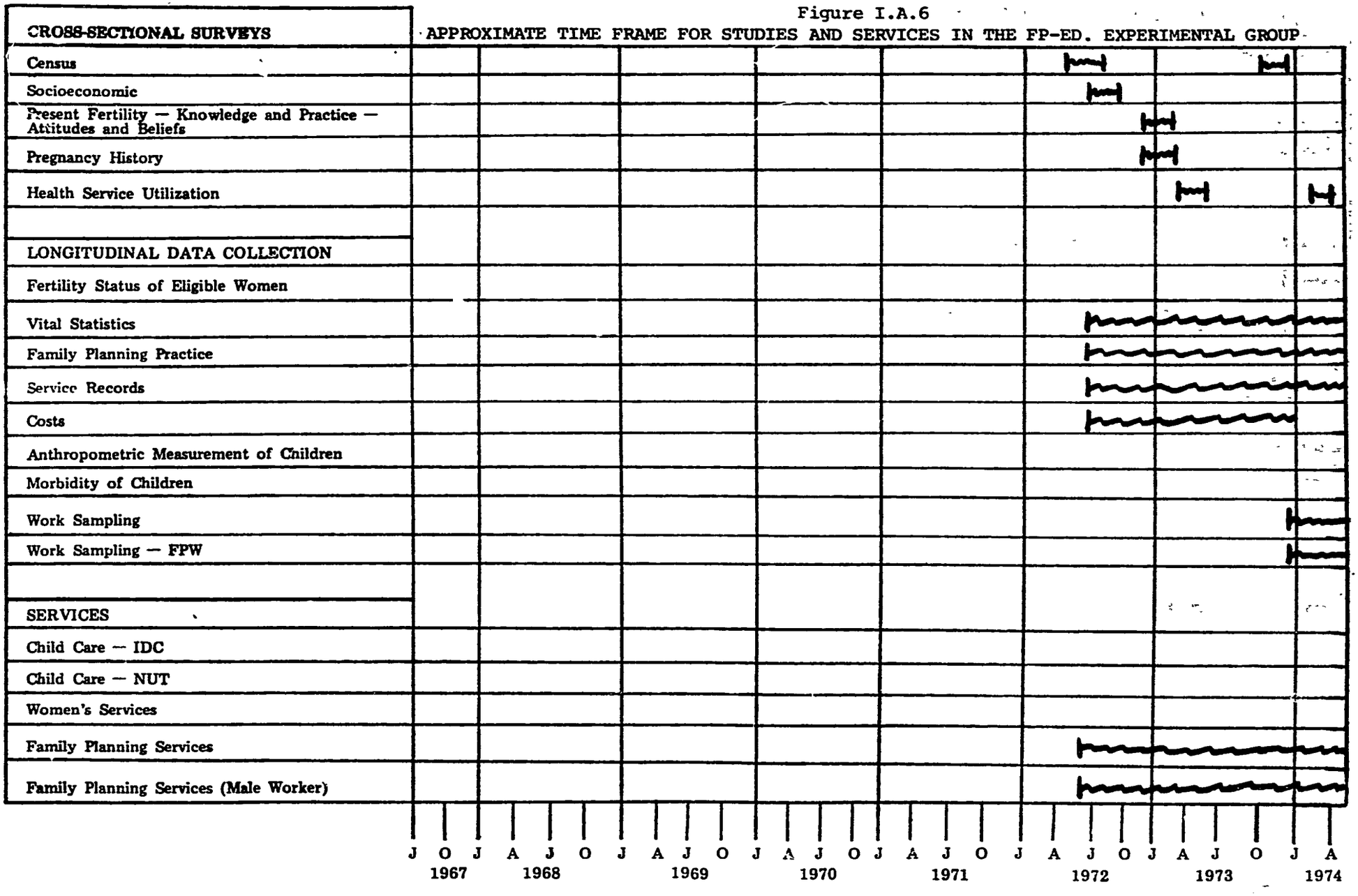
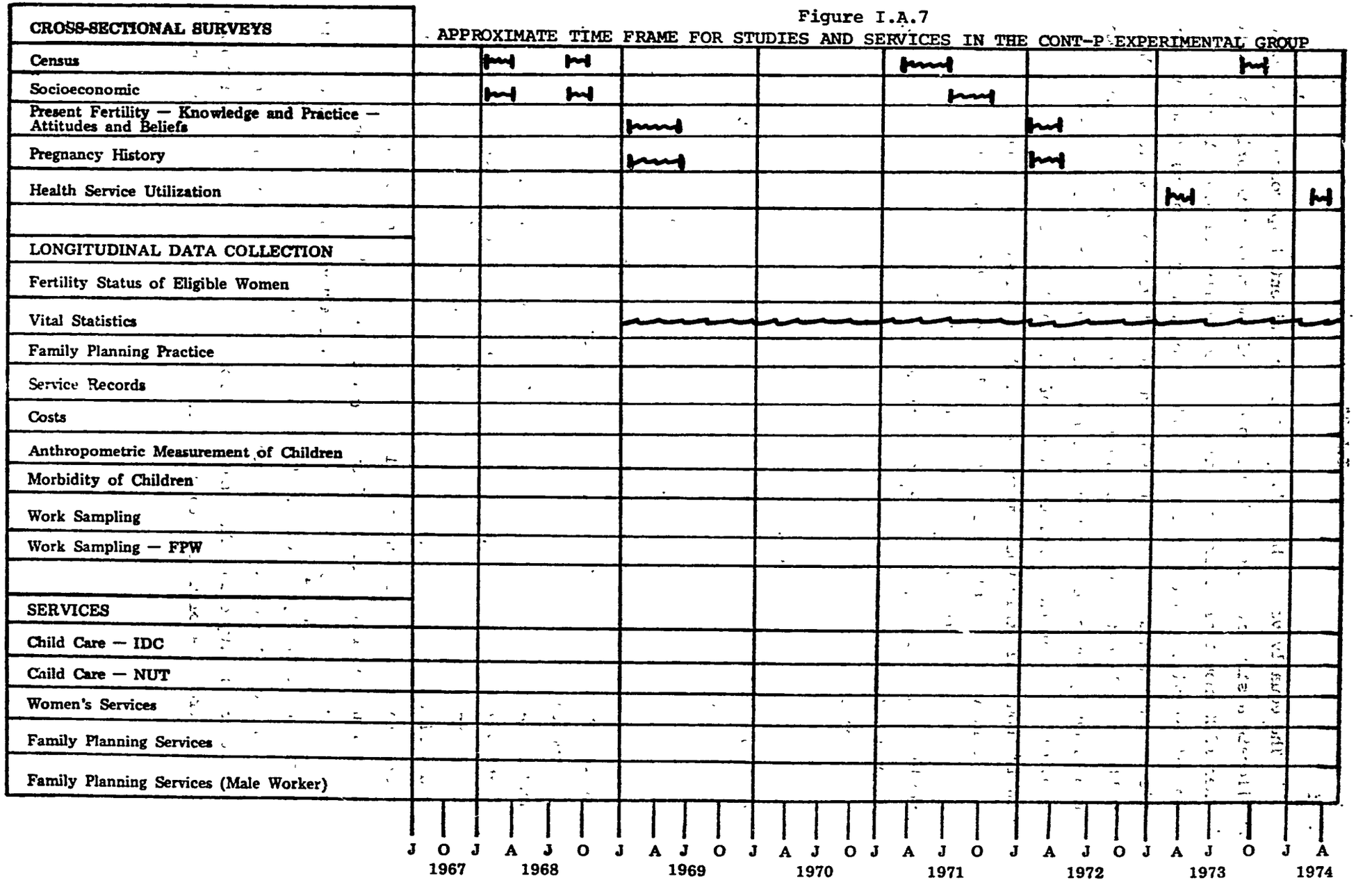


Figure I.A.7

APPROXIMATE TIME FRAME FOR STUDIES AND SERVICES IN THE CONT-P EXPERIMENTAL GROUP



The equally valid but alternative experimental approach would be to allocate a standard service input to each of the major categories of activity. Then if X amount of effort were allocated to family planning, Y effort to women's services, and Z effort to child care, the group of villages receiving all services would get X+Y+Z in total quantitative input, while the other villages would get proportionately less. In order to carry out this experimental design precisely it would be best to have different groups of workers providing each of the services in all of the villages in order to equalize their input. But this would mean that in the combined care villages three different workers would be involved and logistically this would introduce great problems. It also is such a categorical approach that it probably would not fit readily into the eventual health plans for integrated services in most national programs.

Certainly from the perspective of India's health plan it made the most sense to have a single multipurpose worker in each village. These considerations, however, made it particularly important for us to use functional analysis work sampling techniques to actually quantify the eventual balance of services that were being provided by each of our workers.

6. What We Have Learned About Field Research

Prospective field research is so difficult and expensive that it is incumbent on those who have been involved to synthesize their best judgements about lessons that have been learned to guide others who will undertake similar endeavors. A partly facetious word of warning is the frank advice - don't. The complexities and unforeseen difficulties loom so large once one is in the field that no one should start such a prospective study if there is any other way to get the information. On the other hand, there are things that cannot be learned in any way except by in-depth immersion over long periods of time in situations where the problems are acute. There are also the tremendous gratifications which come from really getting to know a group of people as wonderful as village Punjabis.

The more one does field research the more one realizes that each situation is unique and that great caution must be exercised in extrapolating lessons from one situation to another. Lessons that can most readily be

applied in other situations are those that deal with methodology. Specific research processes and approaches obviously can be transferred most readily. In the comments that follow we refer mostly to lessons that apply to international collaborative projects but many of the points apply equally to field projects conducted by health and family planning specialists within their own country.

a. Things That We Did Right

In our judgement, the following items contributed to whatever success we had in the Narangwal Rural Health Research Center.

1) Becoming a part of the villages we were studying and involving the village communities in the research. Much of the most important thinking about research issues emerged from frank discussions with village people.

Equally important was the psychological set that living in the village gave to members of our staff. There was considerable self selection among those who applied to work on this village project. They tended to be individuals with a natural affinity for simple living and genuine regard for village people. This was true both for Indian staff members and for international staff.

2) Recruiting individuals who had been personally involved in practical programs serving poor people gave a sense of reality to the whole program. This reduced the tendency to concentrate on complicated and esoteric ideas which seem academically interesting but are beyond the economic constraints of developing countries. We found that the best way of keeping services simple, practical and inexpensive was to give preference in selection of staff to individuals who had worked in villages.

3) Involvement of all staff members in research thinking and innovation was also important. In the field it was apparent that many of the best ideas came from family health workers. They told us what would not work and their suggestions tended to be more realistic and innovative than those proposed by experts. This involvement of peripheral workers was tremendously important for their morale and sense of worth and this

feeling was nurtured by reiterating the observation that they were the most important research workers in the project.

4) The arrangement to have the research based in academic institutions also proved important. A practical orientation in field work is not enough. If prior involvement in field work were sufficient to produce innovative ways of solving village problems, then solutions would have already emerged from individuals working full time in primary health centers. There is need for reflective and analytic thinking about basic issues and understanding of comparative experience using the best available knowledge around the world. The original ideas to be tested in a research design can be worked out in an academic atmosphere where appropriate attention can be devoted to quantification that is scientifically convincing. Implementation also requires backstopping from an academic base to which problems can be referred for ready consultation with some continuity of expert opinion. Finally, for the field work to have meaning there must be an equally strenuous and time consuming effort devoted to analysis and write-up of the data collected.

5) Continuity and long-term funding is especially important. We were fortunate in getting five years of support for the basic project. Even this did not prove long enough and for the most productive results the project would have had to be extended. This kind of prospective field research must have a time perspective that permits a careful tooling up period and then sufficient time in the field to measure complex variables. Simple and straightforward problems may be resolved in short term field projects but efforts to get at the really important and fundamental issues will require a much longer commitment.

6) Provision of adequate logistic support took constant attention. One of the greatest difficulties in setting up a research base in a village situation is the absence of service facilities and logistic support which would normally be available in an urban setting or institutional base. In was therefore necessary to establish as part of the Rural Health Research Center a rather complete administrative organization providing such crucial services as careful control of finances, provision of housing and a

special workshop to maintain transportation. The two greatest personal problems for our staff were housing and transportation. For housing we worked out an arrangement whereby we rennovated ordinary village houses to make them comfortable places to live. This included safe water supply, sanitation, screening and ventilation. When electricity became available we also installed lights and fans. The arrangement with village owners was that this renovation would pay for a lease of five years, after which time the house would either be returned to the village owner or an appropriate rent would be paid. This activity required a staff for housing maintenance. Rental allowances went into a housing fund which was self-liquidating over the five years of the project.

7) Careful attention to measurement and quality control of statistical information was a major concern. Rigorous field conditions made measurement extremely difficult. A continuing issue was to keep a proper balance between service inputs and the effort devoted to data collection for research purposes. From functional analysis data and the staff composition, we calculate that the eventual distribution of effort in the entire project was approximately 30% for service, 50% for research and 20% for administration and support services such as building maintenance.

Considerable effort went into establishing good quality control of data collection. At the research center at Narangwal special arrangements were set up for information storage under village conditions. It took some time to establish uniform identification numbers for each individual so that all of the information sets could eventually be linked and comprehensively analyzed.

8) Constant involvement and feedback from government officials and those involved in service and teaching helped greatly in the field work. Through the years one of the strongest contributions of the Narangwal Rural Health Research Center was made through a series of annual conferences. At these three-day meetings in the village, senior officials from the central and state ministries of health and family planning and representatives of other official agencies and educational institutions participated enthusiastically. They had to live in tents and meetings were

also held in tents. Provisions were made for time to be spent in field visits, so that outside experts could be exposed to all of the types of activity which were going on. In discussion groups, data from the previous year's research were presented for interpretation by those who would be most involved in implementation. Great enthusiasm was generated among our staff by the knowledge that senior officials were interested in the work and many practical suggestions were made about ways to make the work more useful. These meetings proved to be tremendously valuable in getting rapid implementation of findings and we were frequently surprised by the speed with which recommendations for training programs and service activities became government policy and were incorporated in five-year plans.

9) Summer Conferences. In the Punjab heat, when daily temperatures were ranging between 110° and 120° F, we took the project staff away from the villages for a week of intensive discussion. These meetings were usually held in Himalayan hill stations under conditions conducive to frank and open discussion. The work of the previous year was reviewed in detail and plans for the future were developed. These meetings maintained morale and good interpersonal relationships among the staff and helped reduce the strains associated with being constantly together for work and for day-to-day living.

10) A delicate balance between Indian personnel and Johns Hopkins faculty had to be maintained. Total funding for the Narangwal project was not available at the start but had to be added incrementally with a gradual build-up of project activities and staff. When the full range of activities was established in both the Narangwal Population and Nutrition Projects, there were some 165 Indian staff members on the payroll. Most of the time we had two to three Hopkins faculty and much of the time there was only one. These faculty were multinational, coming from six different countries.

11) We tried to provide training opportunity for our staff. It was considered important that all who worked at Narangwal should get maximum educational value from their work. We provided opportunity for

individuals to advance their education. During the 14 years that the Narangwal Rural Health Research Center operated there were twelve staff members sent for graduate work in public health in the United States and England. Of these, eight received training at the Master's level and three received doctorate degrees, and one was involved in a special program. In addition, a large number of staff members were provided with financial support for educational programs leading to advanced degrees in India, including correspondence courses while on the job. Finally, after the project was terminated, a special scholarship fund was established for further education of selected staff members.

b. Things That We Did Wrong

In retrospect, we are aware of a number of things that might have been changed. Some problems seem inherent in the realities of field work, and there were constraints which may have led to the same choices a second time. For instance, some choices were determined by our attempts to make sure that every decision had the concerrence of village people. Similarly, since our whole research activity was monitored by officials of the Ministry of Health and the Indian Council of Medical Research, many decisions and appointments had to be cleared by them. The following experiences are summarized for the benefit of others who are undertaking similar field research projects with the hope that they will be alerted to some potential difficulties.

1) Delays in implementing parts of the experimental design proved to be a major weakness of this research. We have had to compensate for the different time of starting by a variety of statistical techniques. Strong inferences can still be drawn, but some causal relationships have apparently been diffused by the differences in the starting times of various experimental groups. According to our original model, we had hoped to continue field work until each experimental group had reached a plateau of family planning utilization. Because the project was terminated early these plateaus never appeared and judgements must be based on differences in acceptance patterns and slopes of curves.

Failure to start all parts of the project at the same time had several causes. As indicated earlier, our advisors in the government were looking ahead to the future needs of the government program. They indicated interest only in a demonstration of how family planning services could be provided in the context of women's services, child care and nutrition. When the experimental group for family planning was started it was decided that this should not be limited to family planning services but that it should be an intensive trial to see how much family planning utilization would be achieved by population education.

An important internal consideration also delayed simultaneous implementation. We decided against conducting separate pilot projects and instead developed field methods for both services and data collection in one or two villages of a group. The main reason was that it did not seem fair to choose a village for a pilot project and then pull out services after one year. We developed services in an evolutionary way under actual field conditions. This proved valuable because for each package of services we evolved better patterns of activity than anything that we would have planned.

Each package of services was developed separately and in sequence. Our preliminary conceptualization of interactions postulated that five years would be needed before the child care component of services would influence family planning utilization, so we started with child care services. We felt that the next plateau would result from the interactions of women's services and family planning. It was our expectation that family planning services only would plateau first. The premature termination of the project made it impossible to really put this model to a test since all curves were still rising at the end of the project.

2) Continuing changes in the pattern of services provided as inputs into experimental groups proved to be another difficulty for the analysis. Because of the need for constantly improving and adapting what was done in the field, service inputs evolved steadily. Even after the pilot year of testing in one or two villages staff were encouraged to constantly look for ways to improve service activities. Numerous feedback mechanisms were designed to make everyone aware of areas in which

improvement was needed. Particularly useful in this regard were conversations with and visits of government officials and educators. As innovations were developed they would be built into standing orders and training programs. The fact that the inputs were quite different at the end of the experimental period from what they had been at the start obviously does not make for a clean experiment which should have a definite starting point and testing sequence. It should be noted, however, that the evolution of services occurred within defined limits of what the service packages components were to be for each of women's services, child care and family planning.

3) Analytic problems also occurred because of delays in evolving a tight information system. A certain amount of evolution occurred in research methods and information systems but not as much as in the service components. Some changes were made in the questionnaires when they were administered on the second round, mainly by adding some questions which had emerged as being important. Our greatest problem was in vital statistics reporting because of the pattern of village exogamy which has already been mentioned. This cultural characteristic led to approximately one-third of our births and many of the infant deaths occurring in the home of the bride's parents away from the study village. We therefore set up multiple ways of getting information on births and deaths. If we had had only one means of getting vital statistics information, as most studies do, we would have trusted the results without much question. Our experience now leads us to question seriously the validity of anyone's vital statistics reporting. The problem of differential underreporting is probably not as serious when a large study population is being observed. But for us this proved to be a very serious issue.

4) Following naturally from the above, we made a serious mistake in not structuring our experimental groups to include larger numbers of people. Our preliminary calculations showed that we should have had 8,000 in each experimental group to demonstrate the sorts of differences we expected to see in birth rates. We were faced with a trade-off problem because of our particular interest in the group of

objectives dealing with practical service development. We felt we had to keep the population size down to an absolute minimum in order to concentrate on detailed measurements of service developments in accord with the primary interests of the government. Since we were hoping that the project would continue for a longer period of time, we felt that if birth rates fluctuated too much we would be able to compensate by using two year moving averages. Again, because the project was terminated, we do have fluctuations in the birth rates which are difficult to compensate for.

5) Lack of a strong Indian institutional base proved both politically embarrassing and functionally deleterious. Through the whole period during which the Rural Health Research Center functioned we enjoyed multiple institutional affiliations. Our primary liaison with the government of India was through the Indian Council of Medical Research. Prior to the start of this project during the rural internship study we had developed strong affiliations with seven of the leading medical colleges of India and with four of the state ministries of health. After that our closest working relationship was with the Ludhiana Christian Medical College, the Chandigarh Post-Graduate Medical Research Institute and the All India Institute of Medical Sciences in Delhi. We provided trainees from these institutions with various kinds of field experience. We also had active collaboration with scientists in these institutions on particular sub-studies especially those requiring special laboratory services. As political uncertainties developed it became apparent that we would have been much better off with only one strong institutional affiliation which would have provided maximum opportunity for continuity.

6) Insufficient preparation for impending political realities finally led to the termination of the project. The last two years of the project were a period of great political uncertainties. Indo-American relationships had deteriorated following the Bangladesh War.

We naively thought that our good relationships with the Indian government would make it possible for this research to continue and in fact this project survived for a year longer than any other American project in India. During this last period intensive efforts were made to have international involvement in the project transferred to and funded by the World Health Organization and in fact such arrangements and funding were generously worked out by WHO. Within the particular local situation that evolved it then proved impossible to make this transition. The project was closed down with one month's notice in May 1974. Compounding the problems of premature termination were those due to the serious disruption in morale and staffing during the last several months as a result of the preceding uncertainties about continuation.

7) A lack of formal career structure made it difficult to maintain continuity of Indian leadership. Because we did not have a single strong institutional base our Indian staff were constantly aware of the fact that they were in a short term international project with no security or long term career potential. The problem was complicated by the fact that because of our government affiliation we had to use government salary scales as a basis for paying staff. We were fortunate that the Punjab government assigned a certain number of their health services staff to work with us on deputation. Because of the wide recognition of Narangwal in Indian academic circules it was also possible for many of our staff to find employment in educational institutions with their Narangwal experience being considered a special kind of training.

8) Related to the previous point is the general fact that we had a great deal of turnover at all levels in our staffing pattern. Fortunately a strong core remained throughout. The turnover seemed to develop a spontaneous phasing so that Narangwal served as a continuing training center for field workers. Many of our staff left to take positions in teaching institutions or in government service. Perhaps the greatest reason for turnover was because staff members left to obtain further education. Many of the staff and especially the family health workers were

married while on the project but the majority of these continued to work.

9) Personnel relationships were too individualistic. In retrospect, we probably made a mistake in getting too far away from the usual Indian government personnel practices. In trying to maintain relaxed democratic relationship it became apparent that many of the things we did were confusing to staff members. It was particularly hard to get understanding of the notion when special promotions or salary increments were given on the basis of merit and for good performance that this should not immediately become a right for all members of the staff. Fortunately in the handling of personnel relationships we had the wisdom and judgement of Indian leaders such as Dr. R. D. Singh, a senior Indian administrator with long experience in international work. Thanks to the patience and efforts of Dr. Singh and other staff members, the working relationships were on the whole cordial and congenial.

10) Inability to proceed with total planned implementation of the Narangwal pattern in other parts of India was a further disappointment. Again, because of the premature termination it was not possible to carry through with implementing the Narangwal findings. For approximately three years there had been intensive discussion with the government and the Indian Council of Medical Research about arrangements for a demonstration project in Bihar. The purpose would have been to take what had been learned at Narangwal and make the service packages available to a much larger population. Services would have been provided within the cost constraints and personnel levels that could be generally implemented in an Indian national program. A deliberate effort would have been made to select a very poor and underdeveloped area. Although such a project did not develop in India, transfer of knowledge occurred elsewhere, as in a demonstration project in Bangladesh, described in the summary.

B. DESCRIPTION OF SERVICES PROVIDED IN THE NARANGWAL POPULATION STUDY

A major goal of the Narangwal effort was to develop an effective service model combining health and family planning for testing in rural demonstration projects and subsequent wider application following appropriate streamlining.

1. During the initial stages of the project certain crucial decisions were made about the framework of the services. These were: (1) to use the existing regionalized pattern in India to facilitate implementation of the results of the study; (2) to concentrate on prospect for bridging the gap between the health services and people's homes in the primary care interface; (3) to focus on providing family planning and health services for women and children, and to provide only limited services to men; and (4) to refrain from including in the integration effort mass programs such as malaria control or other services covered by national programs which continued in parallel in our study villages. Integration of all basic health services at the village level was considered a more appropriate activity for subsequent demonstration projects.

2. The reasons for assigning high priority to services for women and children included:

a. The official Indian government policy to integrate maternal and child care services with family planning making this issue particularly urgent. It seemed that a natural relationship could be established combining maternal and child health programs and family planning.

b. The greater mobility of adult males made it possible for them to leave their villages to seek medical aid in primary health centers or elsewhere.

c. The likelihood that allocation of scarce resources to intensive home contacts concentrated on the approximately 40 percent of the village population who are children and the 20 percent who are women of reproductive age would produce the greatest impact on health status and fertility. Further focussing of effort was possible by selecting out high risk individuals within these groups.

d. The research objectives were to test specific hypotheses related to the health of mothers and children.

3. The services were organized according to the following underlying principles:

a. As much responsibility as possible would be delegated to those with minimum training consistent with good care, especially the family health worker (FHW), the indigenous midwife, village attendants, and the families themselves.

b. Medical diagnosis and care would be moved as far as possible to the periphery in the service system and in a setting appropriate to the village environment. An essential aspect of this was to have FHWs live in the villages where they worked.

c. The service would provide good communications and medical back-up for referral.

d. Rather than waiting for serious illness to develop, preventive services, early diagnosis and care, and home contacts would be emphasized.

e. A major investment would be made to get complete coverage through surveillance rather than trying to get compliance with mass procedures for control. For instance, weighing and measuring of children would be done regularly to identify faltering growth and then nutritional supplementation would be focussed on those in need. Similarly, intensive prenatal screening for high risk pregnancies would provide a basis for identifying high risk cases so that normal deliveries could continue to be handled by dais (indigenous midwives).

f. Supervisory checks and support would be routine to maintain worker motivation and quality of services.

g. Particularly important would be continuing education of all members of the health team through regularly scheduled in-service training programs and the development of field manuals.

h. Community participation in planning and implementing the services would be encouraged.

The process of developing the services was evolutionary and followed the general cycle of starting from the simple, then being willing to test multiple alternatives using complex procedures of research when they were appropriate, and then returning to the simple in streamlining for implementation. During the early stages of the project as the services were evolving, new components and programs were added gradually, enlarging the scope and complexity of the services. About midway through the project a conscious effort was made to begin to trim away unnecessary parts of the services with the ultimate goal of arriving at a simple model in line with realistic cost and manpower constraints. This process was still in progress at the termination of the project.

This evolutionary process made it impossible to plan and implement all the experimental service inputs at the same time. The children's services were evolved, tried out and applied first, followed by women's services and family planning. Table I.B.1 lists the effective starting dates for all the major service components, by village and experimental group. These dates refer to the point in time at which the preliminary development of the initial service packages was considered far enough along to implement complete services uniformly in all villages.

1. Children's Services

Children under 3 years of age bear the brunt of mortality, morbidity and malnutrition in rural Punjab and in most areas of India. This includes the neonate whose immediate well being may be determined by the health and nutrition of the expectant mother. The child care program provided intensive care to children 0 to 3 years of age, and episodic coverage of children 3 to 15 years old. Intensive care included routine health and development surveillance, immunizations, nutritional supplementation and curative care. Episodic coverage for older children was primarily curative services in subcenter clinics at the initiative of the family when the child was ill.

Table I.B.1

EFFECTIVE STARTING DATES OF THE MAJOR SERVICE COMPONENTS IN EACH OF THE STUDY VILLAGES AND EXPERIMENTAL GROUPS

		Children's Services	Women's Services	Family Planning
I.	FP+WS+CC			
	1. Ballowal	Sept. 1968*	Jan. 1969*	Sept. 1969*
	2. Chaminda	Sept. 1968*	Mar. 1969*	Sept. 1969*
	3. Dhaipee	Sept. 1968	Feb. 1969*	Sept. 1969*
	4. Dolon Kalan	Mar. 1969	Oct. 1969	Oct. 1969
II.	FP+WS			
	L. Sekha	-	Feb. 1969*	Sept. 1969*
	2. Uksi-Dudhal	-	Apr. 1969*	Sept. 1969*
	3. Chomon	-	May 1969	Sept. 1969*
	4. Kishanpura	-	Mar. 1970	Mar. 1970
III.	FP+CC			
	1. Mansuran	Sept. 1968*	-	Dec. 1970
	2. Rattan	Sept. 1968*	-	Dec. 1970
	3. Saya	Sept. 1968	-	Dec. 1970
IV.	FP-Ed.			
	1. Rajoana Kalan	-	-	June 1972
	2. Rajoana Khurd	-	-	June 1972
	3. Barmi	-	-	June 1972
	4. Littar	-	-	June 1972

* Villages in which preliminary development of the different service components had been worked out and tried prior to this date.

During the course of the project as data from ongoing surveys were analyzed, a pattern for defining a "high risk" child was evolved. This knowledge was used to teach FHWs to identify these children and maintain closer surveillance over them than they did for other children. The characteristics predisposing to "high risk" were:

- low socio-economic status of the family,
- low birth weight or prematurity,
- a female child especially when there were more than one in the family,
- age range between 8 and 18 months, and
- a high birth order

The components of children's services which varied between villages according to the experimental design were as follows:

a. Prenatal Care - Tetanus immunizations, iron tablets, etc. were provided to pregnant mothers as an integral component of child care. The care was essentially identical in all villages receiving either children's or women's services.

b. Neonatal Care - The newborn was checked and weighed by the family health worker (FHW) as soon after birth as feasible. Repeat visits at 24 hours, 2, 6, 9, 14 and 40 days postnatally were made on the same schedule as for postpartum care. All neonates with problems or those weighing less than 2500 grams were referred to the physician for evaluation.

c. Routine Care - 0 to 3 years of age:

1) The underlying principle for the whole health program was surveillance in the sense that much effort was devoted to screening for morbidity and growth faltering. Then care could be provided early and in a highly focussed pattern. Each child was checked at home in a systematic sequence. This involved a history and review of symptoms, examination of the child, and checking for psychomotor development milestones. Health education was given to the mother as needed. These visits were more frequent during the first year of life and then

gradually decreased to quarterly visits in the third year. No routine checks were made after 36 months of age unless there was a specific problem to follow up. Trials were made of different timing and frequency of visits during the first year of life to try to find what would be both effective and realistic. In the FP+WS+CC villages visits during infancy were every month but midway through the study this was changed to seven visits spaced after the last postnatal visit. (See Table I.B.2 for the timing of these visits, their content and relation to women's services). In the FP+CC villages, however, a weekly morbidity survey was part of the data collection for the parallel nutrition and infection study and this look the place of the health check. During the final year of the study, after the nutrition project was completed in May 1973, the frequency of visits in these villages was reduced to a biweekly visit during the first year of life and then according to the pattern of the FP+WS+CC villages for children over one year. These variations were made to determine whether more frequent visits might explain the greater impact on infant mortality that had been found in FP+CC villages.

2) Surveillance was also the rationale for regularly measuring weight and height as a health and nutrition monitoring device. Children were weighed and measured as part of the health check. Mothers of older children were encouraged to bring them to the clinic for their measurements. Children who had been identified as faltering below the expected growth curves and especially if they fell into any of the three degrees of malnutrition* were referred to the physician and started on

*Weight for age charts based on those developed by Dr. David Morley were used for each child to monitor growth. Curves were printed on weight charts indicating the ranges for malnutrition as follows:

1st degree--between 70 and 60 percent of the 50th percentile of the Harvard Standard Weight for age (HS-50)

2nd degree--between 60 and 50 percent of HS-50

3rd degree--below 50 percent of HS-50

By plotting the child's weight at each visit on this chart it was easy to identify whether a child was attaining the expected increments in weight for his age as well as whether he was in one of the malnourished groups.

Table I.B.2

COORDINATION OF ROUTINE CHILDREN'S AND WOMEN'S SERVICES
AFTER THE NEONATAL PERIOD

CHILD'S AGE (Months)	CHILDREN'S SERVICES					WOMEN'S SERVICES	
	Health Check	Weight	Diet Survey and Advice	Immunization	Milestones	Fertility Check	Post-natal
1½	x	x	x	-	-	-	x
3rd	x	x	x	-	x	x	
5th	x	x	x	x	-	x	
6th	-	-	-	x	-	-	
7th	x	x	x	x	x	x	
8th	-	-	-	x	-	-	
9th	x	x	x	-	-	x	
11th	x	x	x	-	-	x	
13th	x	x	x	-	x	x	
15th	x	x	x	-	x	x	
17th	x	x	x	-	-	x	
19th	-	-	-	x	-	x	
21st	x	x	x	-	-	x	
23rd	-	-	-	-	-	x	
25th	x	x	x	-	-	x	
27th	-	-	-	-	-	x	
29th	x	x	x	-	-	x	
31st	-	-	-	-	-	x	
33rd	x	x	x	-	-	x	
35th	-	-	-	-	-	x	
36th	x	x	x	-	-	-	

regular nutritional supplementation in the feeding center.

3) Although routine annual hemoglobin examinations were initiated at the start of the project, this was discontinued and replaced by hemoglobin assessment only when deemed necessary by the FHW or physician based on clinical suspicion of anemia.

4) Smallpox and three DPT immunizations were given routinely prior to the 9th month. Polio, BCG and measles were given on a selected experimental basis. At various times, smallpox vaccinations were given by the FHW, the FPW, or the government vaccinator. DPT immunizations were first given by a team to get quick coverage of all the children and then the program was shifted to a maintenance routine as part of the responsibilities of the FHW.

d. Nutrition Services

1) At the time of the health check the dietary history of the child was determined and appropriate advice regarding feeding was given to the mother.

2) Early weaning was discouraged both in direct advice to the mother and in special group meetings organized as special educational sessions. After 4-6 months of age, supplementation of breast feeding was encouraged with appropriate locally adapted weaning foods in gradually increasing amounts.

3) Feeding centers were organized as part of child care services to provide supplementary feeding to children less than three who had been identified as faltering in growth. Such children were given food supplements in the feeding center twice a day. If they did not attend, a village attendant (VA) took the food to the home and supervised the feeding. All older children, especially siblings who took responsibility for bringing younger children, were fed if they also wanted some of the supplement. No effort was made to keep an accurate record of feedings provided for those who had not been identified through the surveillance process, nor to provide food to them at home. The supplement at first consisted of a drink of skimmed milk powder fortified with sugar and oil to increase its calories and/or a gruel of cracked

wheat, crude sugar, oil, and skimmed milk. During the last two years of the project combinations of corn-soya-wheat or corn-soya-milk were mixed with oil and crude sugar in the form of various traditional dishes to replace the gruel. All of these foods were quite well accepted by most children. Iron, folic acid, and vitamins were added routinely to the feedings.

e. Day Care Centers

During the harvest season day care centers were organized in some villages for children under three on an experimental basis. These lasted 4-6 weeks while the mothers from poorer families were working all day in the fields. The children were cared for and fed by village attendants under the supervision of the FHW.

f. Curative Care

The village FHW identified illnesses either during a home visit or when the child was brought to the clinic. Histories were elicited, examinations performed, and treatment was provided or referral recommended, according to very specific guidelines in field manuals and standing orders. The latter were changed as FHWs demonstrated increasing ability to handle most of the medical problems which could be treated on an ambulatory basis. Children with serious illnesses or with symptoms clearly defined in standing orders were referred to the physician at the time of a weekly visit, or if necessary, the physician made an emergency house call to see the child in the village if the parent could not take the child to project headquarters. Hospitalization depended on the physician's recommendation and patients were sent either to the teaching health center of the CMC Medical College in Narangwal adjacent to the project headquarters, or if necessary, to the Medical College hospital in Ludhiana 20 miles away. This system was set up to replicate the government's regionalized pattern of care in subcenters, primary health centers, tehsil or district hospitals. As the project progressed it was discovered that more and more cases that would have originally been hospitalized were more adequately treated at home in the village. This was especially true for children with

third degree malnutrition who did not respond rapidly to supplementation. In the long run they did no better with a period of intensive rehabilitation in the hospital than if they continued receiving village level nutrition services.

Children's services were carefully integrated with other services provided in the villages. All women and children in the same family were treated simultaneously in the home or in the clinic. Family planning advice was given according to the entry points outlined in the following section. Careful planning, coordination and timing of all of these services was required to assure the most efficient use of precious home visiting time. Special reminder cards were developed for each family which showed when each visit was due and the appropriate activities.

The above reminder cards were an integral component of the family folder which included all records of women and children in each family. An index card for each child was filed separately to help locate the appropriate family folder. The folders included routine visit cards for the health check, the weight chart and patient cards for curative services. Research data were collected on special morbidity, anthropometry, dietary survey and feeding center record forms. Index cards of children requiring special surveillance (such as malnourished children) were kept in a high priority file in order to assist in keeping track of them. At one point, special weight cards were also kept by the mother, but because of all the other records it was felt this produced unnecessary duplication since the chart on the record seemed to provide an effective audio-visual device for educating the mother. Under non-research conditions, however, we would recommend that the family retained weight card should be used.

2. Women's Services

Many services provided to women in study villages were considered to affect both women and children as a unit. This overlap became apparent after we designated prenatal services as an integral component of children's services. There was also much overlap in the way curative

services were provided to women and children. However, certain unique aspects of women's services need to be emphasized.

First, for maternity care the FHW functioned through the indigenous midwife (dai) at the time of labor. She also involved the dai as much as possible during antenatal and postnatal care. This policy contrasted with the decision that all child care services should be provided by the FHW.

Second, emergency obstetrical cases often can be more rapidly disastrous and can immobilize the patient more completely than childhood emergencies. This gave rise to the need for somewhat different means of providing support for the FHW, including rapid access to well-equipped hospital services. Finally, many of the services to women involved a cyclical pattern of pregnant and non-pregnant states as compared with child care which was continuous and linear paralleling the development of the child.

As evolved at Narangwal, the components of the women's services included:

a. Fertility Surveillance

Each potentially fertile married woman was visited every two months to record the dates of her menses, detect early pregnancy and screen for symptoms of illness, especially gynecologic disorders. This visit was a central activity in scheduling home visits and maintaining the link between the FHW and village women.

b. Antenatal Care

When a pregnancy was identified at the time of a routine bimonthly visit, care was started with an antenatal check at that visit plus four more successive visits at home or in the clinic (approximately at 22, 34, 36 and 38 weeks of the pregnancy). The services included weight, height, blood pressure, abdominal examination, urine and hemoglobin. The latter two were done in the subcenter by the FHW. At the last visit the FHW and the dai went to the woman's home to make arrangements for the delivery. In addition, care was taken to predict and prepare for possible complications at the time of delivery. An important part

of antenatal care was the classification of women into four risk categories.

I - Normal
II - Abnormality in present pregnancy (twins, breech, etc.)
III - Previous obstetrical complications
IV - Unfavorable stature (below a specified height), age, or parity

Appropriate management of high-risk categories II, III and IV was decided by the physician.

Routine treatment during the pregnancy included medication for parasites, a series of two tetanus toxoid immunizations, iron, folic acid, and health and nutrition advice. Occasionally on the recommendation of the FHW or physician, pregnant women received nutritional supplementation.

b. Labor and Delivery

The families and the attending dai were instructed to notify the FHW at the onset of labor. The FHW was prepared to attend the labor and delivery if it did not appear to be progressing normally. She did not attempt to observe the process continuously but made repeat visits as required to monitor progress. A list of "danger signals" during labor was used by the FHW for appropriate management and to call for consultation and help. Physicians were provided with special emergency obstetrical kits for use in such emergencies. At the time of labor and delivery, and during antenatal and postnatal visits, the FHW consistently tried to improve the knowledge and skills of the dai. Emphasis was placed on teaching her the "danger signals" of labor and indications for referral. A more formal dai training program along with special procedures to incorporate the dai even more into the team structure were being developed at the time the project terminated.

d. Postpartum Care

In the immediate puerperium, and paralleling the neonatal visits at 24 hours, 2, 6, and 9 days postpartum, the mother's uterine involution, lochia, vital signs and lactation were checked. Follow-up visits were coordinated with child care on the second and sixth weeks,

and seventh and ninth months postpartum. Special attention was given on these visits to maintaining lactation.

e. Curative Services

Women of all ages were provided care for illnesses either in the subcenter clinic or at the time of home visiting, although the latter was discouraged unless the problem precluded mobility of the woman. As with child care, standing orders and guidelines were used by the FHW to elicit histories, examine the women, give appropriate treatment or refer cases to the physician. Hospitalization or referral to specialty clinics at the health center or hospital was provided when needed.

In both groups of villages receiving women's services, (FP+WS+CC and FP+WS), the women's service component was identical. In the FP+CC villages no women's services were given except for the antenatal part of child care which included: monitoring the menses of fertile women to diagnose pregnancy early, providing tetanus toxoid to prevent tetanus neonatorium, iron, folic acid, nutritional advice, preparation for birth so that neonatal care could be started immediately.

A record system for women similar to that for child care included: index card, high priority file, reminder card, a routine visit card (Fertility Survey) and the patient record card. In addition, special records were used to record pertinent information from previous and current pregnancies, including antenatal visits, labor and delivery care and postnatal visits. These all were kept with the children's cards in the family folder.

3. Family Planning

Provision of family planning services in all the experimental villages of the project included education and motivation for the use of contraceptives to limit family size and to space children; provision of contraceptive services; and follow-up of users. At the beginning of the study family planning education and motivation were given in a "low key" manner. It was felt that previous adverse reactions by villagers to government family planning campaigns and the backlash to the

mass IUD campaign necessitated a cautious approach while developing rapport and understanding between the project staff and the villagers. Thus, we started by letting people know that contraceptives were available but they were provided without aggressive family planning education to those who requested them. After other services were well established FHWs were encouraged to discuss family planning with women on an individual basis during contacts for other services. It was left up to the FHW to sense intuitively appropriate times for such discussions. When a potential acceptor was identified, advantages and disadvantages of various methods were discussed, but no pressure tactics were used and there were no monetary or other incentives offered. No targets were set, but specific routines for follow up of acceptors were established. It was soon recognized that appropriate subjects and occasions to advise family planning were not easy for a young, frequently unmarried worker to recognize. Therefore, a specific effort was organized to formulate guidelines for the FHW to utilize her other service contacts more effectively for introducing family planning advice. These occasions when family planning had to be discussed with the women in the village were termed "entry points." In addition to the FHWs efforts, a male family planning worker was engaged in educational efforts among the men.

a. Systematic Family Planning

FHWs were trained to recognize and offer standardized advice on eight occasions ("entry points") during the women's care cycle. This later was expanded to a total of 14 entry points incorporating additional occasions related to care of children. Since many women's and children's services overlapped, these entry points also frequently coincided. On such occasions the FHW was expected to combine the appropriate entry point education.

In summary, the entry points were as follows:

1) During the routine fertility survey of non-pregnant menstruating eligible women.

2) At the time of confirmation of pregnancy.
3) If pregnancy ended in abortion, at the time of post-abortion care.
4) Approximately at the 36th week of pregnancy during an antenatal visit.
5) At the time of the 14th day postpartum and neonatal examination.
6) At the 6th week postpartum examination combined with the well-baby check.
7) During the 5th to 6th month after delivery before daughters of the village left their mother's home and when daughters-in-law returned from their maternal homes. This was combined with the well-baby check, immunization, and weighing of the child.
8) During the 7th month of lactation combined with the well-baby check.
9) During the 9th and 10th month of lactation combined with the well-baby check.
10) With the routine health checks of children under 3 years of age.
11) With the routine weighing of children under 3 years of age.
12) At the time dietary advice for a child was given.
13) Following completion of a child's basic immunizations.
14) Following identification or treatment of specific health problems including malnutrition, prematurity, anemia, congenital disease, accidents, and severe illnesses of children.

The frequency and content of the family planning advice depended on the women's reproductive history, family socioeconomic conditions, family health, and prior attitudes towards family planning. Especially important was the use of a family planning "profile" developed for each eligible woman which the FHW used to determine the intensity with which limitation or spacing of children should be encouraged. This profile

was based on the number of living children, sex of living children, elapsed time since the last pregnancy, spacing, occurrence of abortion or family planning failures, and health of the mother. At first the classification provided for "high," "medium," and "low" profile women. Those with a "high" profile received the most frequent and intense advice emphasizing limitation. The profile was subsequently modified near the end of the project to include only "high" and "low" profile categories. Specifically the final criteria of a "high" profile woman consisted of:

- presence of a chronic illness, <u>or</u>
- an induced abortion or family planning failure within the previous two years, <u>or</u>
- three or more living children with at least two sons and less than five years since termination of the last pregnancy, <u>or</u>
- less than three living children with less than two years since termination of the last pregnancy.

The FHWs rapidly learned to classify women appropriately but they were also encouraged to use their judgement to determine when advice could be given. A round "clock-like" dial device was developed to help the FHW remember when to give the appropriate advice. This was found helpful until the FHWs had used the entry points sufficiently to recognize them reflexively. In the final form, entry points were used by the experienced FHWs in a consistent manner, but with some flexibility permitting more frequent or less frequent advice depending on their judgement of need as well as the immediate home visiting situation. For example, if male members of the family were present at the time of an entry point, advice or discussion was postponed until the next opportunity to see the woman alone.

b. Provision of contraceptives

The contraceptive methods made available to all potential acceptors included condoms, foam tablets, diaphragms and spermicidal cream, oral pills,* injectable Depo-Provera (provided by Upjohn Pharmaceutical Company), intrauterine contraceptive devices (the Lippes 27.5mm Loop and a shield shaped polyethylene device developed at Narangwal, the "Taviti"), sterilization of both males and females, and instruction in the rhythm method. Following the introduction of the liberalized abortion laws, assistance was provided to women seeking induced abortions. Because of Punjab regulations, both abortions and sterilizations were performed in accredited private or government hospitals to which the acceptors were referred. All the other methods were provided by resident field staff or at the time of the project physician's weekly visit to the subcenter.

Although all methods were discussed with potential acceptors, suggestions for the most appropriate methods were made by the worker after a screening history and examination. Recommendations for a method other than that chosen by the acceptor were made only if there were medical or social contraindications. For example, pills were not given during lactation, but Depo-Provera was used as an interim measure since it does not interfere with lactation. However, the Depo-Provera was not suggested for prolonged use unless the couple was relatively certain that they had completed their family. Sterilizations were not urged unless the couple had two living sons because of strong evidence that families desired a minimum of two sons.

Conventional contraceptives including condoms and foam tablets were dispensed by the FHW, FPE and FPW. Diaphragms were used very infrequently and were fitted by the physician. At first pills, injections, and IUDs were given only by the physician after examining the acceptor. In the final year of the project the FHWs were taught to dispense pills and insert IUDs after completing a check list and examination. If the latter were entirely negative, the FHW could procede on her own, while any

* Ovulen and a low dose oral contraceptive manufactured in India, Primovolar.

positive findings on the check list or in the exam required referral to the physician for evaluation. Although a similar pattern was judged feasible for injections, it was not carried out except on a few occasions. This was due to the feeling that more caution needed to be exercised with Depo-Provera as long as it was considered a drug still in the clinical testing stage.

c. Follow up of contraceptive users

Follow ups were carried out by FHWs in clinic and home. Encouragement and support were stressed as important components of follow up. Schedules for follow up visits varied as follows:

1) Conventional contraceptives: Enquiries were made at each home visit associated with the Fertility Survey (bimonthly). Supplies were dispensed at that time by the FHW. Alternatively the male FPW distributed supplies (condoms) on his routinely scheduled visits.

2) Oral pills: Users of oral contraceptives were visited at monthly intervals for three months and thereafter every two months at the time of the Fertility Survey. Supplies sufficient until the next visit were provided and careful enquiries were made related to the manner of taking the pills, any menstrual abnormalities, or other possible side effects. The FHW checked the supplies to verify that the pills had been taken before providing subsequent cycles.

3) Depo-Provera: Monthly follow up visits were carried out for three months and then every three months at the time repeat injections were due. Examinations and enquiry were similar to those for pill users. The weight and blood pressure of the women was also checked. Because of frequent prolonged amenorrhea associated with Depo-Provera, oral estrogen therapy was provided 10 days each month to induce withdrawal bleeding.

4) IUD: Acceptors were checked one week post-insertion, and then at one and three months after insertion. Thereafter the follow up was coordinated every four months with the Fertility Survey. At each visit an enquiry was made whether the patient could still feel the threads of the IUD and whether she had any symptoms such as cramping

and bleeding. If there was any question about the IUD being in place, the FHW or the physician checked it by means of a pelvic exam.

5) Sterilization: Following vasectomies the man was visited by the FPW to ascertain whether any complications had developed and to make sure the man understood the need to continue another family planning method until his semen was checked and found negative for sperm. When tubectomy cases returned to the village frequent visits were made by the FHW to check the wound and change the dressing as needed until the incision was healed.

d. The Male Family Planning Worker

The combination of family planning with women's and children's services produced a family planning program centered on women. It was felt that, unlike health services which men could seek elsewhere, family planning contacts with men were essential to provide adequate coverage of both members of the couple. This was especially true since the husbands were generally considered decision makers in regard to family planning. To provide special coverage for men, a male family planning worker (FPW) was used to supplement the activities of three or four female FHWs. The FPW made routine visits to all husbands in study villages, to motivate them to use contraceptives, to supply condoms to acceptors, and to follow up users. An important aspect of the FPWs village visits was to discuss problem cases with the FHW and to coordinate the motivation of both husband and wife in resistant cases. The work load of the FPW was organized so that he could spend full time on family planning. On occasion, however, he assisted the FHW in providing smallpox vaccinations and other immunizations.

e. The Family Planning Education Villages

The provision of family planning services in these villages was similar to that in other study villages with respect to actual delivery of contraceptives and the follow up of users. These two activities, however, were carried out primarily by one family health supervisor (FHS) who served all four villages, and by one physician who was available for supervision, referral, and consultation.

The major difference in the Family Planning Education villages was that home visiting was limited to family planning education, group education meetings were organized and no health services were provided. The basic village-level workers were called family planning educators (FPE) and were junior basis teachers (JBT), a category of village teachers with essentially the same total amount of educational preparation as ANMs. This precluded any chance that health care might be delivered under pressure of the villagers. In order to provide structure to the home visits, a sequence of discussion topics was developed to be used by these FPEs in routine visits to each eligible woman, approximately once a month. When an acceptor was identified she was referred to the FHS or physician for contraceptives. In order to supplement home contacts, group meetings of women were organized to discuss various aspects of family planning. These proved quite useful and before the close of the project similar meetings were being organized in all the study villages according to the pattern developed in the FP-Ed. villages.

f. Family Planning Records

In villages with women's services all family planning visits were recorded on the women's patient record. If advice was given at the time of a specific entry point, a special notation was made in the space provided on the form. In the FP+CC and FP-Ed. villages a special family planning record was utilized because the services were separated. In addition, the FPWs and FPEs kept separate records for each of the men or women visited. Lists of all acceptors as well as a special index file of all users was maintained to ensure adequate follow up.

4. Staffing of the Service Programs

The basic staffing pattern of the Narangwal services consisted of a female family health worker (FHW) assigned to each village subcenter; one male family planning worker (FPW) for every three or four FHWs; and one family health supervisor (FHS) for every three or four FHWs. In addition, public health nurses (PHNs) provided overall supervision of the female field workers, one PHN generally being responsible for eight or more village subcenters while services were originally being

developed. Physicians participated in the coordination and supervision of services and provided service back-up to FHWs by weekly visits to each subcenter as well as by being available for emergencies. Supervision of the FPWs was provided by a male social scientist. Each subcenter served one village with an average population of 1300 to 1500.

Modifications to the above pattern were made in various experimental groups and included the following:

a. In the FP+WS villages four subcenters were served by three FHWs, one FHW covering two smaller villages. This was purposely done to provide a preliminary opportunity to ascertain whether performance of the FHW would be influenced by having to cover more than one village - it did not show any obvious detrimental effect.

b. The FP+CC villages were also part of a nutrition and infection study and therefore had five FHWs in the three villages, because a major part of their responsibility included a detailed morbidity survey. There was, however, no FHS since the additional research effort required that these FHWs have training equivalent to the FHSs in other villages. A PHN provided direct supervision to the FHWs in these villages. In May 1973, field work on the nutrition project was completed and thereafter one FHW served each village. In addition, in the first two years of family planning services in the FP+CC villages one full-time and one half-time FPW provided services to the men. This was reduced to one FPW in 1973 to come into line with the other experimental groups.

c. For approximately one year in 1972-73 only one FHS was available to cover both FP+WS+CC and FP+WS villages. During this time she supervised all seven FHWs. Although this restricted her involvement in research activities, it provided an opportunity to observe the feasibility of greater service coverage by the FHS and the coverage seemed adequate.

d. In 1973 one of the more experienced FPWs was given responsibility for additional group education in all study villages. This consisted of helping the other FPWs organize group meetings and

film shows.

e. The FP-Ed. villages had staffing ratios similar to other villages except that FPEs replaced FHWs. In addition, there was one FHS for the four villages to provide contraceptive services but she was not the FPEs supervisor. Instead, the FPEs were supervised by a female supervisor with a social science background who was the equivalent of the FHS or PHN in the other cells. Finally, although the physician provided back-up contraceptive service and participated in group meetings, the overall supervision of the activities of the cell was provided by a social scientist. In comparison to the other cells, this replaced a similar level of supervisory input supplied by PHNs and physicians.

f. The staffing pattern for PHNs and physicians varied depending on the numbers available and the intensity of their involvement in research activities. It was greatest at the beginning when the services were first being developed and was decreased as the efforts were standardized. The ratio of physicians and PHNs to subcenters varied from 1:4 to 1:8. Most important was a frequent lack of lady physicians to supervise both child care and family planning activities. The FP+WS+CC, FP+WS and FP-Ed. villages had the most consistent availability of lady physicians. During the last year only one lady physician was available and she had to selectively divide her time among all groups of villages. As a result, on several occasions male physicians provided all services except gynecology and family planning. In the FP+CC villages especially this dual type of coverage by a male physician for child care and a female physician for family planning proved necessary for most of the study time and this made for minimal integration of services. Another variation was that a PHN with special training in family planning served as a physician substitute during the last year of the project. At one time or another she backed up family planning services in all villages of the project.

g. An important requirement for all three types of peripheral workers (FHWs, FPEs, and FPWs) was the availability of "relievers."

These were reserve workers of the same category who filled in for the regular worker when she or he was on leave. This provided a continuity of field work which was considered essential for research data collection, as well as for making the services more consistent and more credible to villagers. Such a system should be considered mainly for large blocks of leave (e.g., maternity leave) when manpower is limited in the government setting.

h. Finally, in each village with children's services (FP+WS+CC and FP+CC) two local women were hired full time to assist the FHW in the feeding centers and home follow up. These village attendants (VA) were directly supervised by the FHW.

All of the organizational patterns and variations are summarized in Figure I.B.1 (2 parts).

5. Background, Selection, and Role of Different Staff Categories

All service staff were essentially similar to comparable levels of workers in government health services with a few modifications to permit flexibility in the research situation of Narangwal. The basic characteristics of the different categories of service staff were as follows:

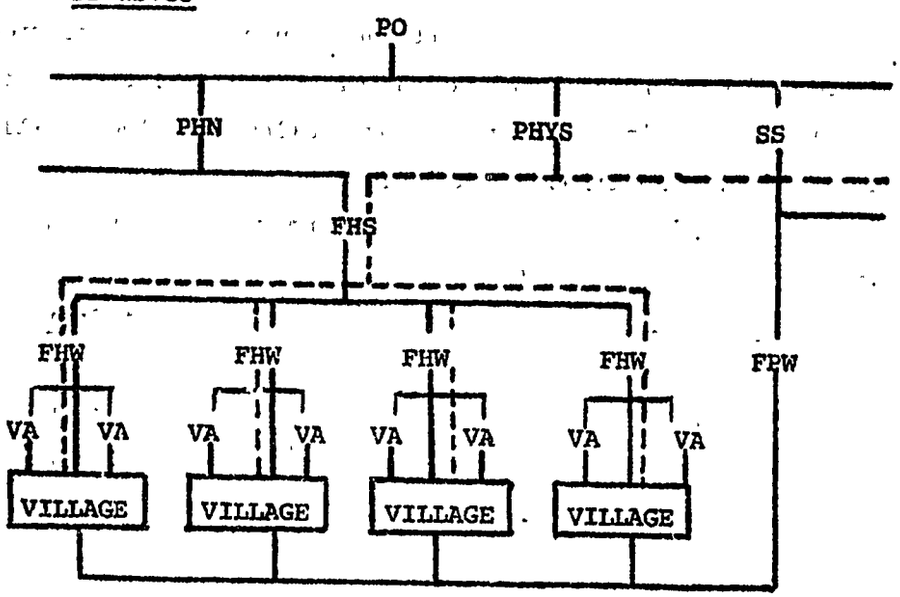
a. Family Health Worker (FHW)

Two types of health workers were recruited for this position. In the FP+WS+CC and FP+WS villages they had received standard government prescribed training as an auxiliary nurse midwife (ANM). This consisted of two years of hospital and field training following 8 to 10 years of basic education. The emphasis was mainly on hospital midwifery. In the FP+CC villages the FHW was a lady health visitor (LHV), which meant that she had received 2½ years of training beyond 10th grade in a special program involving both hospital and field training. The field and public health aspects of the LHV training were more intensive than that of the ANM. The FP+CC group of villages was part of the parallel nutrition project and in that research it was found that the data gathering requirements of the morbidity survey were particularly demanding. Therefore, the slightly greater academic qualifications of

Figure I.B.1
(2 Parts)

ORGANIZATIONAL DIAGRAM OF SERVICES IN EACH EXPERIMENTAL GROUP

I. FP+WS+CC



II. FP+WS

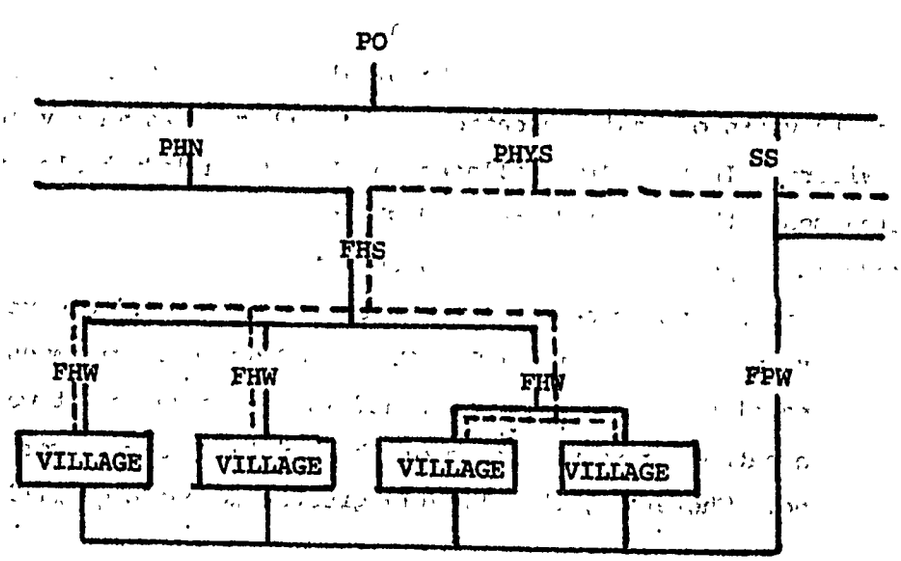
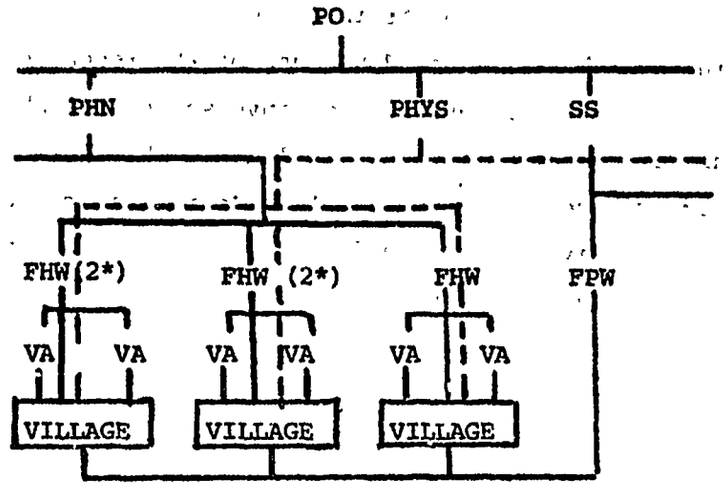


Figure I.B.1

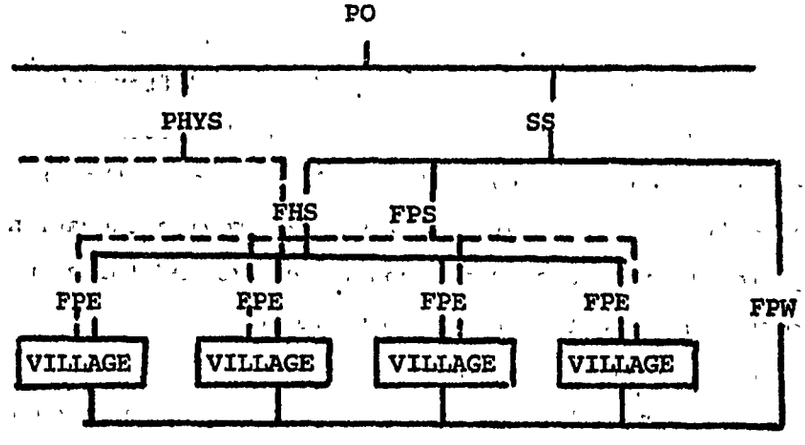
(Part 2)

III. FP+CC



(2* FHWs up to May 1973)

IV. FP-Ed.



KEY:

PO = Project Officer or Director
PHN = Public Health Nurse
PHYS = Physician
SS = Social Scientist
FHS = Family Health Worker Supervisor
FHW = Family Health Worker
FPW = Family Planning Worker
VA = Village Attendant
FPS = Family Planning Educator Supervisor
FPE = Family Planning Educator

Note: Solid lines indicate major lines of authority and supervision. Broken lines indicate predominately referral and patient care supervision.

the LHV were considered necessary.

All FHWs were recruited through newspaper advertisements and selected by means of an interview and the results of a non-verbal intelligence test (Raven's Matrix Test). Final selection was based on their performance during the training period. Reading and writing ability in English was required because of the research component of the project; however, ability to converse in English was not essential. As a result of project experience we learned that FHWs with little previous experience were more receptive to retraining in new service patterns than individuals who had long experience in government health centers. The role of the FHWs was to be the primary health worker in each village providing both home and clinic services as required by the project design. She also referred cases as needed to the FHS, PHN, and physician.

b. Family Planning Educator (FPE)

This worker's background was as closely matched as possible to the ANM, except that the training was in a non-health field. Females of similar age and general education with two years' training as junior basic teachers (JBTs) were selected in a manner similar to FHWs and retrained for their new roles. The FPE's command of written English was often not as adequate as the FHW's (due to differences in their previous medium of instruction) so that all FPE records were recorded in Punjabi or Hindi. The role of the FPE was to be the primary family planning motivator at the village level, to provide education in family planning, to offer some specific contraceptive and follow up services and to refer cases to the FHS and physician.

c. Family Planning Worker (FPW)

Men with either a high school or undergraduate college degree were selected as FPWs. No formal health training or experience was required. Selection was based on similar criteria as for the FHW except emphasis was placed on apparent maturity and probable ability to relate and communicate with village men. The role of the FPW was to develop good relationships with the men of the study villages in

order to educate them about family planning and motivate them to use contraceptives when appropriate. They also provided condom supplies and followed up husbands of all contracepting couples.

d. Family Health Supervisor (FHS)

The supervisors of FHWs (the ANM type) had been trained as LHVs. This is the pattern in the Punjab government services. In selection they were chosen either from among the FHWs in the nutrition study villages or less often directly as FHSs. Special leadership qualities were looked for in the potential FHS since her main role was to support and supervise the FHWs. In difficult or emergency situations she occasionally provided direct services to women and children. After FHWs were trained to screen potential contraceptive users, dispense oral pills and insert IUDs, the FHS was generally the first to institute these delegated activities in each group of villages. In the FP-Ed. villages the FHS functioned more on the level of an FHW in providing contraceptive services directly. However, because of her greater experience, she was also frequently used to assist the FPS and social scientist in supervising the FPEs and in group education.

e. Public Health Nurse (PHN)

The public health nurses recruited for Narangwal had primary responsibility for development of services and supervision of major parts of the data collection (e.g., morbidity, anthropometry, and fertility surveys by the FHWs). Their background varied from diplomas in public health, to bachelor's and master's degrees in addition to standard nurses training. The PHNs played a critical role in designing the innovative reorganization of services and in the establishment of supervisory patterns, record systems, writing of manuals and standing orders and in training. Because of the developmental nature of the services it is not surprising that they also assumed major responsibility for much of the actual supervision of the female field workers. As the project progressed, this responsibility was passed to the FHS at the field level. PHNs very rarely stepped in to provide actual services, leaving this up to the established FHW - physician

referral system. As mentioned earlier, the only major exception was the utilization of one PHN to provide family planning as a substitute for a lady physician.

f. Family Planning Supervisor (FPS)

The direct supervisor of the FPEs had a master's degree in education. As in the case of the PHN, it was felt that a relatively well-qualified individual was needed during the developmental stages of the FPE service pattern. The FPS besides providing the basic field supervision of the FPEs, participated in training programs and often conducted village group meetings.

g. Social Scientists

Although selected entirely on the basis of potential contributions to the research aspects of the Narangwal studies, social scientists were also designated to provide field supervision of FPWs and to assume overall responsibility for the FP-Ed. villages. Those involved had backgrounds in sociology or social work at the master's or Ph.D. level. The justification for using individuals with a high level of training was because of the experimental and developmental nature of the work. The social scientists organized the FPW activities and most of the FP-Ed. program and then were responsible for the continuing modification of these services. Actual supervision of FPWs was limited to only a fraction of a social scientist's time, while overall direction of the FP-Ed. villages required approximately half-time for one social scientist.

h. Physicians

A wide variety of background and experience characterized the physicians of the project. They ranged from individuals with no specialty training but with many years of field experience in primary health centers and government family planning programs, to physicians with specialty training in pediatrics, obstetrics-gynecology, and public health. Generally those with extensive special training served as project officers and were infrequently involved in actual delivery of services. They assumed the overall role of directing and developing

both service and research components of the project in the field. The other physicians were deeply involved in research and development also, but their primary role included provision of referral services to FHWs and FPEs, as well as coordinating field supervision with FHSs and PHNs. Finally, all physicians participated actively in the training programs and development of manuals.

i. Village Attendants

The village attendant was generally an illiterate woman selected from the study village who needed employment. Ages varied from teenagers to older women past the reproductive age. Some happened also to be dais. Their main role was maintaining the feeding center, preparing food supplements, supervising the feeding in the center, feeding non-attenders at home, and assisting the FHW in weighing and maintaining records of malnourished children. In addition, as needed, they assisted the FHW in other activities such as calling referral cases to the clinic, rounding up children for routine weighing or immunizations and as a direct channel of communication to the village women.

j. Others

Other workers were related fairly directly to service programs:

1) Laboratory technicians provided simple clinical laboratory tests such as stool exams, blood smears for RBC morphology and malaria parasites, white blood counts, urine sediment exams, and sputum smears. These technicians also performed special laboratory tests for research substudies and prepared medicines for use in the villages.

2) A nutritionist was employed for the research aspects of the nutrition project. She also assisted in developing and supervising the feeding centers. Especially important was her role in evolving the varied food supplements used as weaning foods from the basic staples that were available.

6. Other Program Components

a. Facilities

In each study village one of the first activities after its selection was the renovation of a village building or house to become a subcenter clinic and headquarters for the village services. Generally an existing or new building was donated by the village or an individual for renovation. The renovation of the older structures included adding cement floors, screens, a latrine and a driven hand pump for water supply. The space was divided, when possible, into two rooms, one for consultation and the other for examinations, IUD insertions, etc. Attempts were made to ensure that each clinic was reasonably accessible to all village families and did not antagonize any one faction by its location.

The subcenters were sparsely equipped with the minimum essential furniture and equipment, much of it made by project carpenters. These included a simple desk, chairs, storage cabinets, wooden examining tables, and filing cabinets for records. Purchased equipment included scales, kerosene stoves, trays and instruments.

In villages providing nutrition services an additional room or a room in one or more separate buildings was used for a feeding center. Location was planned to give easy access to poor and high risk families. A stove, utensils and food storage bins were all that were required as equipment, apart from rugs or mats for the children to sit on.

The workers' village residence was a major concern. Space was usually rented from a respected family and one or two rooms were provided with improvements such as cement floors and screening. A bath and a kitchen always had to be built for the worker.

The Narangwal headquarters was in converted village buildings which provided research and administrative offices. A large training room was used for staff education and a small but comprehensive library was available. A consultation-examining room was maintained for cases referred from the villages to the project physicians. Emergencies that could not be handled at the project headquarters on an ambulatory

basis were referred to the nearby teaching health center or to the medical college hospital in Ludhiana.

b. Supplies

Each fortnight when the field workers were brought by project vehicles to the headquarters for training sessions they utilized the opportunity to replenish their subcenter supplies. Alternatively, requests were forwarded through supervisors and supplies were sent in the vehicles at the time of field visits.

A set formulary was established for drugs used both by FHWs and physicians. Supplies for physicians' use were kept separately in each village, and each of them carried a complete medical box of special supplies on field visits. The formularies were frequently reviewed to ensure that they were limited to essential drugs that were really used. Almost all drugs were purchased from supply houses in India, except for special items such as Depo-Provera and measles vaccine.

Food supplies were obtained from relief agencies, although crude sugar and oil were purchased.

One of the most effective examples of gaining community participation in the work was an arrangement that evolved with some of the panchayats for getting them to provide food. At harvest time, panchayat members made the rounds of the farmers to get them to contribute a proportion of their crops. This food was stored by the panchayat to be distributed as needed to the feeding centers. In some instances an excess of grain would be sold so as to buy other products, such as sugar. Since food proved to be one of the most expensive components of the whole care program, this reduced greatly the cost of the services to RHRC (in the actual costing procedure described in Chapter III, estimated costs were developed for such donated food).

c. Transportation

Family health workers, FPEs, FPWs and FHSs all used bicycles for transportation within and between villages. Ability to ride a bicycle was a positive consideration although not essential in the selection of new workers. However, if they did not already ride

bicycles they had to learn after joining the project. The bicycle was especially important to the FPWs and FHSs who had to cover more than one village. PHNs and physicians used project vehicles including motorcycles and scooters to travel to the villages. Vehicles, mostly four-wheel drive, also were used to bring field workers to training sessions at the Narangwal headquarters.

d. Village participation

Cooperation of the village people and their leaders was essential for the service programs and indispensable for the collection of survey data. Negotiations and discussions with villagers were initiated as part of the process by which study villages were selected and their enthusiasm was one criterion in selection. Discussions with panchayats were repeated periodically throughout the project. Whenever any problems developed in delivery of services, changes in programs, complaints from villagers or from the field workers, they were resolved usually in a constructive fashion cooperatively with the village leaders and those villagers most directly involved.

In addition to maintaining good rapport, active support and contributions from the village were sought as described previously. Donation of buildings, "adoption" of our workers, and contributions of wheat were the major examples of this type of involvement

An important asset to the project was the active support and cooperation provided by the Punjab Directorate of Health and Family Planning (DHS) and its many local, district and state officials. The project was thoroughly discussed with them on many occasions and permission was obtained to carry out all the studies and services in the selected villages. The DHS withdrew their own services when requested by the project in order not to have overlapping and contaminating services in study villages. Established government services not provided by Narangwal were continued in these villages, such as malaria surveillance and smallpox vaccination. An experienced DHS lady physician was deputed to work in the project and assistance was given in recruiting ANMs and LHVs. Officials frequently visited the

project to observe and discuss the progress. During the final year of the project six government ANMs and LHVs were given a four week training course following the Narangwal pattern in order to provide additional services in villages previously a part of the nutrition and infection study. The project's functional analysis team worked with the DHS in evaluating government health services. Altogether a close and productive affiliation was developed between the DHS and Narangwal RHRC.

As mentioned previously, direct service ties were maintained with the Ludhiana Christian Medical College program for referral of patients. In addition, on occasion, interns, medical students, nursing students, and others made use of the project for demonstration of village-level services. Project physicians also provided emergency services to the health center and participated in some field teaching sessions. Residents and trainees from other Indian institutions also used RHRC for field training, especially the All India Institute of Medical Sciences in Delhi and the Post Graduate Institute of Medicine in Chandigarh.

The importance of local private practitioners, mostly indigenous, in the village setting was identified in earlier studies. Contacts were made at the beginning of the project and the fact that services would be limited to women and children was stressed. In response to their concerns, it was emphasized that the project was not out to take away their patients, but was most concerned with preventive services. The fact that services were not provided to men made this assertion much more credible. Relations with dais was of special concern. Dais were encouraged to report all deaths, births, and pregnant women. A small monetary incentive was provided for each reported event. Training and involvement of dais in maternal care to expand their traditional role was promoted sporadically throughout the project, but a complete training program was being developed to involve them much more extensively when the project terminated.

SECTION II

GENERAL INFORMATION ON VILLAGES

SECTION II

GENERAL INFORMATION ON VILLAGES

A. DEMOGRAPHIC AND SOCIOECONOMIC BACKGROUND

1. Methods and Data Base

Demographic and socioeconomic data were collected in three censuses of the study villages in the years 1967-68, 1971-72 and 1973, and in two socioeconomic household surveys at the time of the first two censuses. Villages in the family planning education group, however, were not included in the first round of either survey.

A team varying from 6 to 10 interviewers were responsible for these two types of surveys. Both young women and men with masters or bachelors degrees were recruited as interviewers and given intensive training in interviewing techniques and use of the interview schedules. They were supervised by one of the social scientists.

a. Census

The census was carried out after the study villages were carefully mapped and households numbered. During the census interview all families within each household were identified and all resident members recorded. To be considered a resident the member had to have been living in the village 6 months or expressed the intention to stay a total of 6 months or more. Special care was taken to enquire about members temporarily away, but who were normally residents of the village. Systematic probing to determine the age of each individual was standardized using village events calendars containing Indian months and all major national and local historical events. Reinterviews and cross checks with other data sources showed that this method of determining age was quite reliable. Other information collected at the time of the censuses included marital status, education, occupation and dates of migration, marriage, births or deaths occurring between censuses.

b. Socioeconomic Survey

Multiple social, economic and other household data were collected in all households. Items in the survey included:

- religion and caste
- housing
- sanitation
- selected possessions, including land
- non-land income (labor, service, trade, etc.)
- land (agricultural) income (available only on second survey)

Socioeconomic interviews were with the senior male member of the household, whenever possible, because of the need for accuracy in getting details of the type of crops, yield, and market prices which were used in estimating agricultural income.

The data were edited and combined into a household record so that uniform information on household characteristics, as of July 1972, was available. A total of 5612 households were identified from the censuses. Socioeconomic data were available from at least one round for 5097 households. Data from both socioeconomic surveys were available for 4372 households.

2. Demographic Characteristics

The total population of the twenty-six study villages in July 1972 was 35,125. The villages ranged in population from 629 to 2365 with a mean size of 1350. The size of the five basic population study groups ranged from 6341 to 4914; a sixth group which included three subgroups of the parallel nutrition study numbered 7934.

Except for caste distribution, there was little variation in the demographic characteristics of the study groups (Table II.A.1). The family planning education group had a somewhat smaller household size (5.9) than the other groups and a slightly older population (6.2 percent over 65). The women's services group had the highest percentage of married women ages 15 to 49 years in the population.

The population was predominantly of the Sikh religion, with Hindus making up only about 5 percent of the total. Three major caste groupings have been used in this report: Jats, Ramdasias, and others. The Jats are the traditional landowning farmers and in this area are entirely Sikhs. The Ramdasias are basically a religious sect that comprised most of the lowest castes. These included the traditional leather workers and other occupations considered low status in village society. Recent breakdown of traditional relationships in village

interdependence of caste groups had permitted most Ramdasias to assume new roles primarily as agricultural laborers. The few other scheduled (low) castes, both Sikh and Hindu who were not Ramdasias were included in order to group all low castes together. The "others" were chiefly from other non-scheduled (high) castes and were primarily tradesmen or service workers. Over half of the population were Jats in this primarily agricultural area with a range between 59.5 percent in the family planning education group to 40.6 percent in the slightly more urbanized child care group of villages. The Ramdasias comprised another one-third of the population and their proportion ranged from almost 40 percent in the child care group to 25 percent in the other nutrition villages. The other high caste group made up the remaining one-sixth of the population.

Among caste groups (Table II.A.2), the Jats had a larger household size (6.6) and were older than the other groups, both in median age (22.2) and percent of population over 65 (5.8). The larger Jat household size was due to the greater number of households with extended families among the Jats rather than to larger nuclear families.

The Ramdasias had the youngest age structure and the highest percentage of married women aged 15-49.

3. Socioeconomic Characteristics

a. Housing

The typical village house was constructed with both baked brick and mud brick and had a thick mud roof and a mud-dung floor. Over half of the houses had more than one room and one-fifth had three or more rooms.

The child care and nutrition villages scored the highest in housing, less than 25 percent of their homes being of all mud construction. The homes of the family planning education and women's services groups were the poorest in construction. The greatest differences were along caste lines (Table II.A.3). More than one-half of the Ramdasia homes were one-room houses constructed exclusively of mud brick, while two-thirds of the Jat houses had more than one room and only one-third were of mud brick.

Pumps were the source of drinking water for over 90 percent of the households, and in most cases the pumps were inside the household courtyard. Almost all houses had a drainage system to carry off water from their courtyards to the lanes. Drainage systems for the lanes differed widely among the villages. Some villages had no system, while other villages had drains which served up to 60 percent of the households. The child care and nutrition groups were best in this regard with over 50 percent of the households having drainage along village lanes, while the family planning education group was worst with less than 20 percent.

At the time of the second round socioeconomic survey, all but five of the study villages had electricity. Two villages in the women's services group had none as well as one each in the control, nutrition, and family planning education groups. In the villages with electrical power about 40 percent of the households had electricity. By caste, Jat households and those of the other high castes were almost equal in extent of electrification at 45 and 42 percent, respectively, while only 13 percent of Ramdasia households had electricity.

b. Occupation

Occupation closely followed caste lines: Jats were primarily farm owner-cultivators; the Ramdasias were mainly agricultural laborers; and the other high castes were predominantly tradesmen or service workers (Table II.A.3). The latter two groups were somewhat less homogeneous in occupational status then Jats, however.

Over 70 percent of the workers were engaged in agriculture: almost one-half on their own farms and another one-fourth as laborers. The other one-fourth were chiefly in trade or service work. The only departure from this division was in the child care villages where only one-third of the workers were farm operators and almost as many were in trade or service. This reflects the more urban character of these villages as a result of their closer proximity to Ludhiana and the presence of an unusual concentration of weavers in one village.

c. Income and Possessions

The median total income per household for all villages was 2325 rupees per year. Twenty percent of the households had total income under 1000 rupees per year and 13 percent had earnings over 10,000 rupees. Fifty percent of the households owned cultivable land, with median holdings of 5.8 acres from which a median of 5904 rupees per year was derived. The median income from non-farm sources was 715 rupees. The median value of household possessions, chiefly livestock and agricultural implements, was 4283 rupees.

The greatest difference among the experimental groups was in the FP+CC non-farm income, which was 70 percent higher than the overall average.

As would be expected, the greatest differences in income were between caste groups. The median income of Jat households was over 6000 rupees while that of Ramdasias was just under 1500. The other high caste group had a median income of 1800 rupees. Ninety-five percent of the Jats owned cultivable land while only 2 percent and 20 percent of the Ramdasias and other high castes, respectively, had any holdings.

d. Improvements

Where there were data for a household from two socioeconomic surveys, indices of improvement were constructed based on the monetary value of certain key improvements in the areas of housing, household items, and agricultural implements. The housing items were improvements in the walls, floor, or roof; household items were the acquisition of a radio or a sewing machine (either the first or an additional); and agriculture items were the acquisition of a fodder cutter or a tubewell.

Table II.A.4 shows that the greatest number of improvements occurred in the agricultural area, with over 60 percent of the households having some improvement. About one-third had improvements in other areas. Housing improvements, which were the most costly, showed the greatest differences among experimental groups, with the comprehensive care and women's services groups showing less than one-half as many improvements as the child care and nutrition groups.

Caste differences were most pronounced in the housing and agricultural areas with Jats having almost twice as many improvements as the Ramdasias, with the other group intermediate.

e. Literacy and Communication

Approximately 35 percent of the heads of households were literate. Percentages ranged from almost 40 percent in the family planning education group to under 30 percent in the women's services group. The highest literacy among the castes was the other high caste group with over 50 percent, while the Jats had under 40 percent and the Ramdasias under 25 percent.

The possession of a bicycle and/or a radio by a household was taken as an index of communication with events outside the village. Almost 70 percent of the households had bicycles and over 25 percent had radios. Almost all families having radios also had bicycles. The differences between study groups as well as castes were slight.

4. Summary

In general, the experimental groups were relatively homogeneous in both their demographic and socioeconomic characteristics. Some general observations can be made on several of the groups however.

The child care group (FP+CC) seemed somewhat more urbanized than the other groups with a higher percentage of trade and service workers and a significantly higher non-land income. It also had the highest rate of electrification, lane drainage and housing improvement, and the least all mud-brick housing.

The women's services group (FP+WS), on the other hand, seemed the most rural with its larger landholdings and farm income and its poor showing on improvements, housing, electrification, literacy, and non-farm income. FP-Ed. was similar except for land income and acreage.

The comprehensive care (FP+WS+CC) and population control (CONT-P) groups were intermediate and somewhat similar to the women's services group in median income, housing construction and occupational distribution.

The other nutrition group was comparable to the child care group in median income, housing and drainage, electrification and

improvements but was more heavily agricultural.

The most striking differences, however, were socioeconomic distinctions along caste lines. The Jats were the dominant economic group and stand alone on almost all indicators. The major exception to this was literacy of household head where they were significantly lower than the other high caste group. In addition, there was little difference between these two groups in housing and communication. The Ramdasia group were far behind the Jats on all economic indicators and, except for median farm income and acreage, were also behind the other group.

Table II.A.1

SELECTED DEMOGRAPHIC CHARACTERISTICS OF THE EXPERIMENTAL GROUPS (1972) AND RURAL PUNJAB (1971)

CHARACTERISTICS	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL	Rural Punjab (1971 Census)
No. of Villages	4	4	3	4	4	7	26	-
Population	6,341	4,978	4,914	5,529	5,429	7,934	35,125	103 million
Household Size (Mean)	6.2	6.3	6.5	5.9	6.4	6.3	6.3	6.1
Sex Ratio (M/F x 100)	117	113	116	112	109	115	114	115
Median Age	20.7	20.1	20.7	20.9	21.0	20.1	20.6	18.8
Percent Under 15	36.6	38.6	37.4	38.7	35.9	38.8	37.8	41.9
Percent Over 64	5.6	4.2	4.6	6.2	5.1	4.4	5.0	3.2*
Percent Married Women 15-49	15.4	16.5	15.5	15.1	16.0	15.1	15.6	—
Age-Sex Percent Distribution								
Male 0-14	19.7	21.2	20.1	19.9	19.2	21.0	20.3	22.3
15-49	25.7	24.4	25.4	23.6	24.9	24.9	24.8	23.0
50+	8.4	7.1	8.0	9.0	8.2	7.4	8.1	8.2
Female 0-14	17.0	17.5	17.2	18.8	16.7	17.7	17.5	19.6
15-49	22.4	23.3	21.9	21.3	23.6	22.1	22.3	20.8
50+	6.5	6.0	7.1	6.8	7.3	6.6	6.8	6.1
Caste Group Percent Distribution								
Jat	49.6	46.7	40.6	59.5	52.4	57.3	51.6	-
Ramdasia	33.4	32.8	39.5	28.7	36.1	25.8	32.1	27.6**
Other	17.0	20.5	19.9	11.8	11.5	16.9	16.2	-

*India as a whole. **% "Scheduled" Castes

Table II.A.2

SELECTED DEMOGRAPHIC CHARACTERISTICS BY CASTE GROUP

CHARACTERISTICS		JAT	RAMDASIA	OTHER
Total Number		18,144	11,507	5,474
Household Size (Mean)		6.6	6.0	5.9
Sex Ratio		115	114	111
Median Age		22.2	18.2	20.3
Percent Under 15		34.2	42.7	38.4
Percent Over 65		5.8	3.5	5.3
Percent Married Women 15-49		15.3	16.6	15.0
Age-Sex Percent Distribution				
Male	0-14	18.4	23.1	21.0
	15-49	25.6	23.8	23.8
	50+	9.5	6.4	7.9
Female	0-14	16.1	19.9	17.4
	15-49	23.4	21.4	23.0
	50+	7.1	5.4	6.9

Table II.A.3

SELECTED SOCIOECONOMIC CHARACTERISTICS BY CASTE GROUP

CHARACTERISTICS	JAT	RAMDASIA	OTHER
HOUSING (Percent)			
All Mud Construction	16.2	47.4	23.5
2 or More Rooms	67.7	41.4	66.7
Electricity	45.5	13.5	42.3
Lanes with Drainage	38.4	43.5	50.5
OCCUPATION OF HOUSEHOLD HEAD (Percent)			
Farmer	85.3	8.2	5.5
Laborer	5.3	66.9	27.6
Trade and Service	7.8	23.2	53.4
Other	1.5	1.7	13.4
INCOME AND POSSESSIONS			
Total Income (Median) (Rs.)	6,029	1,485	1,801
Non-Land Income (Median) (Rs.)	86	1,280	1,433
Value of Possessions (Median) (Rs.)	9,214	2,370	2,467
Percent Owning Farmland	95.2	2.1	19.8
Median Acreage (Acres)	6.2	2.6	1.9
Median Farm Income (Rs.)	6,179	1,750	885
PERCENT WITH IMPROVEMENT			
Housing	40.3	18.2	28.6
Household	31.7	22.3	35.6
Agriculture	76.6	45.9	53.4
Any	89.2	60.9	74.7
LITERACY AND COMMUNICATION (Percent)			
Household Head Literate	38.2	22.5	50.4
Households Owning Bicycle or Radio	77.1	64.9	76.4

Table II.A.4

SELECTED SOCIOECONOMIC CHARACTERISTICS OF THE EXPERIMENTAL GROUPS

CHARACTERISTICS	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL
HOUSING (Percent)							
All Mud Construction	31.2	34.7	21.0	35.6	33.9	23.6	29.7
2 or More Rooms	55.9	53.3	58.5	56.8	65.8	58.5	58.3
Electricity	42.2	24.7	42.8	24.3	28.6	35.8	33.4
Lanes with Drainage	44.2	44.0	55.4	16.3	38.8	54.7	42.2
OCCUPATION OF ALL WORKERS (Percent)							
Farmer	44.3	49.9	34.6	47.3	47.6	48.4	45.6
Laborer	27.9	29.9	28.7	20.8	24.8	22.0	25.3
Trade and Service	22.5	17.3	30.8	25.8	23.8	23.1	23.8
Other	5.3	2.9	5.9	6.1	3.7	6.4	5.2
INCOME AND POSSESSIONS							
Total Income (Median) (Rs.)	2,190	2,110	2,425	2,691	2,168	2,435	2,325
Non-Land Income (Median) (Rs.)	577	417	1,213	705	561	683	715
Value of Possessions (Median) (Rs.)	3,905	4,309	3,810	4,681	4,292	4,624	4,283
Percent Owning Farmland	48.1	49.0	42.9	53.9	50.3	55.8	50.5
Median Acreage*(Acres)	5.7	8.5	5.0	4.9	7.8	5.4	5.8
Land Income*(Median) (Rs.)	4,862	6,667	5,013	5,194	5,840	5,273	5,904
PERCENT WITH IMPROVEMENT							
Housing	19.9	15.5	39.9	‡	34.1	40.1	30.3
Household	29.9	27.5	30.1	‡	34.3	25.2	29.0
Agriculture	62.1	61.0	56.8	‡	63.1	63.1	61.4
Any	74.3	70.7	77.3	‡	78.0	80.5	76.5
LITERACY AND COMMUNICATION (Percent)							
Household Head Literate	34.0	28.1	34.2	38.9	35.5	37.0	34.9
Households Owning Bicycle or Radio	68.3	69.8	75.4	70.8	72.7	76.8	72.5

‡ No 1967-1968 socioeconomic survey for comparison

* Median land acreage and income are only of those households owning land

B. PREVAILING FERTILITY PATTERNS AND TRENDS BEFORE 1969

1. Fertility Experience of Village Women in the Punjab and in Narangwal Villages

In a related field project that is being reported in detail separately, members of our Narangwal field staff did an exhaustive search of primary sources of information relating to vital statistics and a range of development indices for all administrative units in the Punjab. A team went to every government office that might have a significant accumulation of data and worked their way through the various registries and files to record what had happened over the ten year period from 1960 to 1970. Much of the information was available at the district headquarters of various ministries and offices but some information could be obtained only from Tehsil sub-units or the local block development offices. The most informative sources were:

a. quarterly block progress reports, covering economic data on fertilizer, pesticides, seeds distributed and total development funds allocated;

b. district medical officers' records of Tehsil data on births, deaths and deaths from 0-1 and 1-5 years of age.

A summary of this information is presented in order to provide a general background.

From analysis of Punjab vital statistics data at the district level, it is clear that in 1969 fertility in Punjab State had been declining steadily for at least a decade, from approximately 46 births per 1000 population in 1959, to close to 32 per 1000 in 1969. In Ludhiana District, site of the project, the vital statistics data show a parallel decline, from 50 down to 35 per 1000 in the same period, although there is a slight suggestion of some slowing in the rate of decline following 1966. Table II.B.1 shows the number of births and crude birth rates for Punjab State and Ludhiana District, 1959-69,

based upon birth registration data which have been inflated by 25 percent in accordance with the adjustment factor suggested by the 1969 birth registration sample survey undertaken by the Punjab State Government (Government of India 1971).

A similar pattern of steadily declining fertility, 1959-69, with a hint of a leveling off beginning in 1967, can also be found in pregnancy history data from our study villages. Table II.B.2 shows marital fertility rates calculated from these data, using 3-year moving averages to smooth random fluctuations, and the equivalent crude birth rates, estimated by assuming the proportion of married women 15-49 years of age to be 18 percent. Figure II.B.1 illustrates these declining crude birth rates for Punjab State, for Ludhiana District, and for the Narangwal study villages, 1959-69. Although the levels differ, due primarily to variations in completeness of data, the patterns are similar.

The pattern of steadily declining fertility observed during this period is undoubtedly related partially to a general advance in social well-being within the State. The 1960s represented a decade of remarkable economic progress for the Punjab but most of this occurred after 1965 when the fertility decline became less marked. The 1970 per capita income was well above the national average, and was itself some 150 percent over the 1960 figures measured in 1970 prices (Punjab Agricultural University, 1974). The proportion of electrified villages in the state rose from 17 percent in 1961 to 47 percent in 1971. The proportion of sown land which was irrigated rose from 54 percent in 1961 to 71 percent in 1971. The total production of food grains in 1969 was more than double that in 1961, in part because the area under high yielding varieties of grain increased, in the case of rice going from 5.4 percent of the total cultivable area in 1967 to 20.1 percent in 1969. Between 1967 and 1970, 500 new schools were built in the state, and the literacy rate rose from 27 percent in 1961 to 33 percent in 1970.

Yet there is little that can be said about the specific demographic processes by which this fertility decline was being brought about. Family planning as an organized effort started in the 1950s

but became an intensive statewide program only in 1965 (Chandrasekhar 1972). Several contraceptives were offered: condoms, foam tablets, and IUDs, as well as sterilization procedures (Government of Punjab, 1971) but the numbers remained relatively small. According to Chandrasekhar (1972) family planning was not being practiced very effectively in any part of India. A rising age at cohabitation after marriage was probably responsible for much of the decline (Wyon and Gordon 1971).

Clearly the presence of such a strong downward trend in fertility in the context of major economic and social development makes assessment of the full impact of our programs more complex.

2. Trends in Age at Marriage and Age at Consummation

It has become generally accepted that one of the major reasons for the decline in fertility which had occurred over the past decade in the Punjab was increasing age at marriage.

Baseline data obtained from women in our study villages clearly show such an increase in age at marriage. The distribution of women in project villages by age at marriage and by calendar year of marriage is presented in Table II.B.3. The mean age at (first) marriage of women who were married before 1940 was 12.8 years. The mean at marriage progressively increased, so that by the early 1970s it was 19.3 years.

In India the common practice is to wait for some time after marriage until a special ceremony (Muklawa) for the consummation of marriage occurs. Since marriage is only ceremonial while the effective date of marriage is that of first cohabitation for an effect on fertility it is the age at consummation that should be considered. The baseline data also show a consistent increase in the age at consummation. The mean age at consummation for women who were married before 1940 was 15.0 years and this gradually increased to 19.8 years by the early 1970s. The mean age at consummation for different years is presented in Table II.B.4. The practice of observing a waiting period prior to consummation was most evident when women were married very young; as age at marriage increased this waiting period decreased. Our data show a gap between marriage and consummation of over two years for marriages which

took place before 1940. However, this gap was reduced to about 0.5 years for those married more recently.

3. Prevailing Family Size and Age Patterns of Fertility

The 1970-71 distribution of women in our study villages by age and parity and by age and pregnancy order provide a general picture of the age patterns of pregnancy experience prevailing in this population in the years prior to the beginning of the project. These data, obtained from pregnancy histories, are presented for each experimental group in Tables II.B.5 - II.B.8.

The distribution of the mean number of live births for each five year age group is shown in Table II.B.5, and the mean number of pregnancies for the same age groups in Table II.B.6. A mean parity of 3.96 and a mean number of reported pregnancies of 4.20 for all women indicate a reported pregnancy wastage of 6 percent, not unusual in surveys of this type. The experience of the six experimental groups prior to 1970-71, both in the number of pregnancies and in parity, was virtually identical.

The age patterns of this pregnancy experience prior to 1970-71 were similar also. Table II.B.7 shows the mean age of women of a given parity, and Table II.B.8 mean age by pregnancy order for each group. For all women the mean age at parity 4, the mean parity, is 33.3 years. Differences among the groups are relatively small. However, the age pattern of fertility in the FP-Ed. experimental group exhibits the greatest variability; in ten of the thirteen parity groups from parities 0 to 12, this group had either the lowest (parities 0-2, 7) or the highest (parities 5-6, 8-10, 12) mean age of any of the experimental groups. This variability is probably related to the fact that surveys identifying vital events prior to 1968-69 were carried out approximately 3-4 years later in the FP-Ed. than in the other experimental groups, and thus reflect a longer retrospective period. This is only one of several indications, which will be noted where appropriate, that the data from the FP-Ed. group should be interpreted with caution.

In some experimental groups the mean age of zero parity women is greater than that of first parity women, and in all groups it exhibits relatively high variability. This is, of course, due to the presence in this group of two different types, young newly married women and older infertile women.

Table II.B.1

ANNUAL BIRTHS AND CRUDE BIRTH RATES,
PUNJAB STATE AND LUDHIANA DISTRICT, 1959-1969

	PUNJAB STATE			LUDHIANA DISTRICT		
YEAR	POPULATION	BIRTHS	CBR	POPULATION	BIRTHS	CBR
1959	8,385,409	380,694	45.5	701,604	35,066	50.0
1960	8,549,788	380,072	44.5	721,330	34,160	47.4
1961	8,712,993	376,573	43.2	740,314	32,905	44.5
1962	8,872,850	368,382	41.5	758,108	32,363	42.7
1963	9,034,303	359,955	39.8	775,558	32,471	41.9
1964	9,190,745	355,099	38.6	792,950	32,586	41.1
1965	9,336,921	352,761	37.8	810,552	31,416	38.8
1966	9,490,950	345,166	36.4	827,180	30,713	37.1
1967	9,655,926	336,816	34.9	843,735	30,472	36.1
1968	9,807,976	325,846	33.2	860,314	30,581	35.6
1969	9,955,973	319,089	32.1	877,056	30,375	34.6

Note: Annual population estimated from adjusted vital statistics between the 1961 and 1971 censuses, and by extrapolation from 1961 to 1959. Births from vital statistics reports of chowkidars, inflated by 25 percent in accordance with the 1969 birth registration study of the Punjab State Government.

Table II.B.2

ANNUAL MARITAL FERTILITY RATES: 3-YEAR MOVING AVERAGES, AND ESTIMATED CRUDE BIRTH RATES 1959-1969 CALCULATED FROM PREGNANCY HISTORIES IN ALL EXPERIMENTAL GROUPS

YEAR	Marital Fertility Rate (per 1000 married women, 15-49 years old)	Marital Fertility Rate 3-Year Moving Average	Estimated Crude Birth Rate
1959	260		
1960	275	263	47.4
1961	255	263	47.4
1962	260	251	45.2
1963	238	244	43.9
1964	233	240	43.3
1965	250	228	41.0
1966	200	220	39.6
1967	210	203	36.3
1968	195	203	36.3
1969	200	198	35.7
1970	200		

Table II.B.3

DISTRIBUTION OF WOMEN BY MARRIAGE COHORT AND AGE AT (FIRST) MARRIAGE
IN ALL EXPERIMENTAL GROUPS

Calendar Year of Marriage	Age at Marriage (Years)																		Not Known	Total	Mean Age at Marriage (Years)
	Below 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26 & Above			
Before 1940	69	30	34	49	47	51	75	30	11	5	3	1	0	0	0	0	0	2	1	408	12.8
1940-1944	26	20	21	34	49	59	106	42	36	35	13	19	6	2	0	0	0	1	1	470	14.6
1945-1949	16	10	12	37	59	83	140	76	65	57	22	46	5	6	0	0	0	2	1	637	15.4
1950-1954	11	9	12	23	46	80	147	94	51	54	18	39	3	1	1	2	1	0	0	592	15.5
1955-1959	3	2	8	11	27	66	128	112	81	91	31	76	19	9	3	2	5	5	0	679	16.7
1960-1964	1	1	3	8	14	45	105	101	91	92	54	96	20	19	3	3	6	4	0	666	17.3
1965-1970	0	2	0	1	7	25	64	94	124	178	117	163	59	53	27	13	14	10	1	952	18.6
1971 & over	0	0	0	0	0	1	3	3	9	12	8	14	2	7	3	2	2	0	0	66	19.3
Year not known	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	102	105	
TOTAL	126	75	90	164	249	410	768	552	468	525	266	454	114	97	37	22	28	24	106	4575	

Table II.B.4

DISTRIBUTION OF WOMEN BY MARRIAGE COHORT AND AGE AT CONSUMMATION OF MARRIAGE IN ALL EXPERIMENTAL GROUPS

CALENDAR YEAR OF MARRIAGE	AGE AT CONSUMMATION (Years)																		Not Known	TOTAL	MEAN AGE AT CONSUMMATION
	Below 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26 & Over			
Before 1940	8	7	10	24	42	69	82	60	38	26	13	7	1	1	0	0	0	0	20	408	15.0
1940-1944	0	2	3	12	38	52	96	64	57	52	20	24	9	3	2	0	1	1	25	470	16.0
1945-1949	3	1	8	18	42	86	135	83	63	75	27	46	11	7	0	1	0	2	29	637	16.1
1950-1954	4	5	4	17	41	68	148	96	63	58	22	34	7	1	2	2	3	0	17	592	15.9
1955-1959	0	2	5	6	19	63	125	110	77	93	34	73	19	10	3	3	5	6	26	679	16.9
1960-1964	1	0	2	3	11	45	104	102	89	92	56	90	19	19	3	3	6	5	16	666	17.4
1965-1970	0	1	0	1	8	24	63	90	118	172	109	160	60	53	28	12	13	8	32	952	19.1
1971 & Over	0	0	0	0	0	1	3	3	9	12	9	14	2	7	3	2	2	0	0	66	19.8
Year Not Known	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	102	105	
TOTAL	16	18	32	90	203	408	756	608	514	581	289	448	128	101	41	23	30	22	267	4575	

Table II.B.5

MEAN PARITY FOR EACH 5-YEAR AGE GROUP OF WOMEN
BY EXPERIMENTAL GROUP AS OF 1970-1971

AGE GROUP	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL
15-19	0.49	0.85	0.79	1.11	0.67	0.76	0.76
20-24	1.43	1.56	1.30	1.30	1.25	1.54	1.41
25-29	2.98	3.07	2.96	3.04	3.06	2.91	3.00
30-34	4.22	4.77	4.44	4.24	3.92	4.06	4.25
35-39	5.64	5.78	5.20	4.89	5.57	5.28	5.37
40-44	6.11	5.86	5.89	5.74	5.59	5.89	5.85
45-49	6.27	6.79	6.42	6.26	6.62	6.16	6.40
≥50	6.30	6.63	6.41	4.75	6.33	6.96	6.44
TOTAL	3.98	4.10	3.96	3.97	3.85	3.91	3.96

Table II.B.6

MEAN NUMBER OF PREGNANCIES FOR EACH 5-YEAR AGE GROUP OF WOMEN BY EXPERIMENTAL GROUP AS OF 1970-1971

AGE GROUP	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL
15-19	0.61	0.88	1.03	1.21	0.80	0.82	0.87
20-24	1.66	1.76	1.51	1.40	1.39	1.74	1.59
25-29	3.21	3.26	3.27	3.26	3.32	3.18	3.24
30-34	4.53	5.03	4.85	4.42	4.30	4.33	4.55
35-39	5.95	5.99	5.63	5.13	5.85	5.52	5.64
40-44	6.30	6.08	6.33	5.91	5.98	6.06	6.09
45-49	6.51	6.96	6.77	6.45	6.87	6.43	6.65
≥50	6.47	6.81	6.74	5.00	6.50	7.18	6.66
TOTAL	4.22	4.30	4.30	4.15	4.12	4.14	4.20

Table II.B.7

MEAN AGE OF WOMEN BY PARITY
BY EXPERIMENTAL GROUP AS OF 1970-1971

NUMBER OF LIVE BIRTHS	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL
0	23.4	22.9	25.4	25.8	23.3	24.8	24.3
1	24.7	24.1	24.0	25.4	24.0	24.7	24.5
2	27.7	25.5	27.5	27.9	26.5	27.8	27.2
3	31.3	30.1	30.3	30.6	31.9	30.3	30.8
4	33.6	32.5	34.0	33.9	33.8	32.7	33.3
5	37.1	36.4	36.2	36.2	36.6	36.3	36.5
6	38.6	38.4	38.3	36.5	36.9	38.3	37.9
7	40.0	39.5	39.8	40.7	39.3	40.1	39.9
8	41.6	40.7	41.9	39.9	42.9	41.9	41.4
9	41.6	43.2	43.2	40.9	43.8	42.0	42.4
10	43.8	42.3	44.9	41.3	43.3	42.7	43.0
11	42.1	45.5	48.2	43.3	46.1	44.6	44.7
12	49.3	-	-	34.7	44.7	43.3	44.5
13	42.2	47.6	43.1	-	-	-	43.8
14	-	-	-	-	49.7	-	49.7
TOTAL	33.1	32.5	32.9	32.7	32.4	32.7	32.7

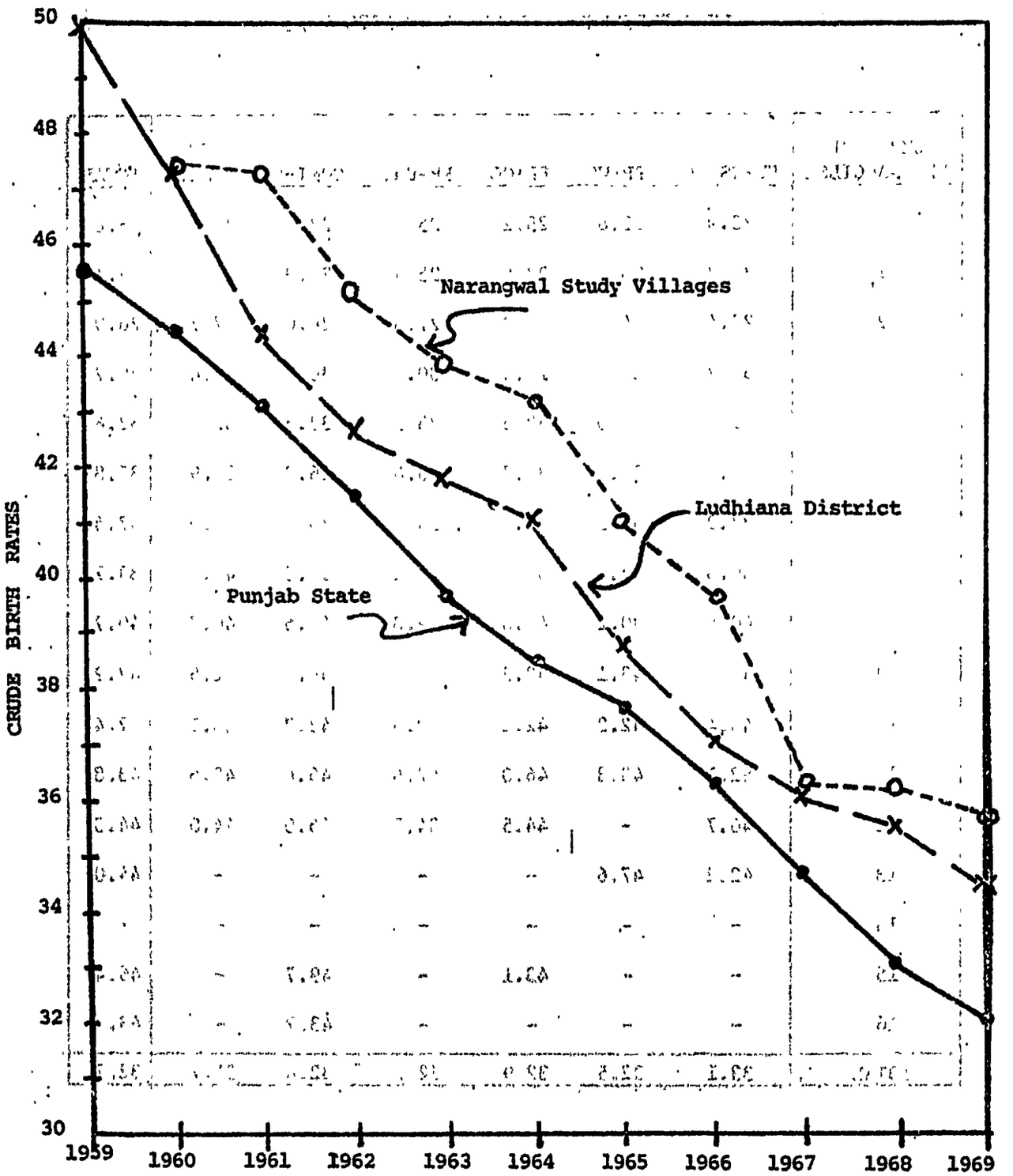
Table II.B.8

MEAN AGE OF WOMEN FOR EACH ORDER OF PREGNANCY
BY EXPERIMENTAL GROUP AS OF 1970-1971

NUMBER OF PREGNANCIES	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other	TOTAL
0	23.0	22.8	25.2	25.0	22.4	24.4	23.8
1	23.7	23.7	23.8	25.4	23.3	24.4	24.1
2	27.4	24.8	26.9	27.6	26.0	27.7	26.9
3	31.7	29.8	29.4	30.2	30.8	29.4	30.2
4	32.3	32.0	32.5	33.5	33.3	32.1	32.6
5	36.3	35.8	35.7	36.0	36.2	34.9	35.8
6	37.9	37.5	37.7	36.3	36.1	38.0	37.4
7	39.5	39.5	39.8	40.2	39.3	40.1	39.7
8	40.8	40.2	41.0	39.8	41.6	40.7	40.7
9	41.8	43.1	42.2	40.1	44.0	42.5	42.2
10	43.4	42.2	42.2	40.3	42.7	43.1	42.4
11	42.1	43.3	46.0	42.6	45.6	42.6	43.8
12	46.7	-	44.5	34.7	46.0	44.0	44.5
13	42.2	47.6	-	-	-	-	44.0
14	-	-	-	-	-	-	-
15	-	-	43.1	-	49.7	-	46.4
16	-	-	-	-	43.2	-	43.2
TOTAL	33.1	32.5	32.9	32.7	32.4	32.7	32.7

Figure II.B.1

CRUDE BIRTH RATE PUNJAB STATE, LUDHIANA DISTRICT, AND NARANGWAL STUDY VILLAGES (3-YEAR MOVING AVERAGES ESTIMATED FROM PREGNANCY HISTORY), 1959-1969



C. ATTITUDES AND BELIEFS

Knowledge, Attitudes and Practice (KAP) studies were very popular in the 1960's as the main field survey method used in burgeoning family planning programs. Their use has rapidly declined in the past few years. The rationale of these studies was that appropriate and adequate knowledge leads to favorable attitudes and that this in turn is a precursor and predictor of individual behavior. Experience has shown, however, that the relationship between attitudes and behavior rather than being deterministic is highly probabilistic. Other variables intervene and the reality is that attitudes can, at best, be considered predispositions toward patterns of behavior.

Partly, at least, because of the unavailability of other methods, family planning researchers, policy makers and program operators tended to use the KAP survey as a major tool to assess the need for family planning, to monitor programs and to evaluate their effects. Perhaps the greatest contribution of KAP surveys was at the start of national family planning programs because they showed uniformly that the people had a favorable attitude which was considerably ahead of their leaders. Repeated surveys to evaluate large scale programs usually showed that greater numbers in the populations had obtained knowledge about family planning and that larger numbers were expressing favorable attitudes. This suggested that hypothesized barriers to the practice of family planning would be removed by more intensive mass publicity.

As family planning programs were started in increasing numbers of countries there was great urgency attached to doing something, even if that something was based on unvalidated knowledge and techniques. As data on use of contraception over time and its measured impact on fertility indicators became available, however, it became evident that knowledge and favorable attitudes were not directly related to contraceptive use and that even avowed contraceptive use showed less than expected fertility decline. There was concern about the low predictive power of attitudes.

Several problems with KAP studies have been defined. First, questions have been raised about the quality of the survey instruments and the need for standardized measures (Mauldin 1966). For instance, knowledge of

contraceptive methods was variously measured by identification of methods by name, or by how the method was used, etc. Second, it was concluded that the attitude measures were unreliable because single questions were asked rather than developing composite unidimensional scales. Thirdly, those carrying out KAP studies came from diverse backgrounds and had little specialized training for such surveys. Fourthly, most of the respondents, especially in developing countries, were being asked questions about subjects that were either totally unfamiliar to them or about which they had never given sufficient thought to have a clearcut attitude. Volatile opinions based on instantaneous response to unusual stimuli would naturally be less reliably measured than crystallized attitudes. Finally, it seemed that for a number of reasons, people tended to misreport their contraceptive use. Shyness may have been responsible for some under-reporting. On the other hand, pressures by family planning workers may have led to over-reporting under government services.

In view of all these problems with KAP surveys, our investment in measuring attitudes and beliefs and knowledge and practice deserves an explanation. First, we tried to minimize the most evident deficiencies of KAP studies. Efforts were made to measure specific attitudes rather than asking global questions. Second, workers were trained and supervised carefully, standardization of interviews was ensured as much as possible through quality control measures, and field supervision was maintained at a high level. Third, our research offered a unique opportunity to validate knowledge and practice measures obtained through surveys by comparing them with longitudinal data on actual use collected through the service programs. Such validation may also help in measuring the reliability of the interviews relating to knowledge and practice of contraception and their relationships with attitudes. This will require more detailed analysis than we have been able to carry out in this preliminary report. Lastly, the interview is still the only way we have of measuring variables such as attitudes toward survival of children.

To study the impact of different service packages we had to start with a baseline description of the population. Attitudes toward family planning and specific contraceptive methods, toward survival of children

and family size at the beginning of the project provided an important part of this baseline. Change was measured by repetition of the cross-sectional survey after two years of services.

1. Development of Survey Forms

The widely recognized difficulty of measuring attitudes and beliefs led us to a cautious approach. There were no standard procedures that could be applied to the questions that we wanted to ask. We were especially conscious of the delicate nature of many of the important issues and the possibility of inadvertently antagonizing village people by questions such as those relating to the death of a son. In addition to long-standing cultural blocks we realized the need for special sensitivity to recent developments such as the backlash that had occurred in Punjab as a result of rumors about the hazards of the IUD.

This led to a sequential development of survey forms by our staff of six Indian social scientists. The first stage was conceptualizing the questions to be asked. This was followed by an essentially anthropological exploration of the issues through in-depth discussions with a limited number of respondents. We then developed a structured format which went through several pre-test field trials. The form was mostly prestructured with only a few items permitting open-ended conditional responses related to reasons for particular opinions. A number of modifications were also made before the second round of surveys because of problems and gaps that had been encountered in the first survey.

2. Selection and Training of Field Investigators

The major responsibility for conducting this part of the research was assumed by the Indian social scientists on our staff. In addition, we had a number of outside consultants both from India and internationally. The social scientists were deeply immersed in the field activities and had major responsibility for assisting in the service programs. They did most of the negotiating with village panchayats; they traced rumors; they were called to talk with recalcitrant villagers; and they were our experts on promoting community action. The staff social scientists were not only

involved in planning and preparing forms but also took major responsibility for supervising data gathering and eventual analysis. At all times during the study, the investigators were supervised by a social scientist. Four different individuals from our field staff were involved at various times in direct supervision of data gathering.

Selection of the social scientists started with newspaper advertisements and went through the usual process of seeking references and interview. A staff varying from 6-8 field investigators was similarly selected by newspaper advertisement and interview. They were all young women and recent Master's graduates in one of the following social science fields--sociology, anthropology, geography, social work, etc. All were Punjabis, although only a few had come from a village background. Their field orientation included discussions of the conceptual and intellectual bases for the research. Forms were explained in great detail. They were given special orientation in interviewing methods for village workers using techniques such as role playing. Finally, as mentioned earlier, intensive field practice was under the direct supervision of the social scientist responsible.

3. Data Gathering

The investigators went out as a group to villages. Each village had previously been carefully mapped and all houses had been given an identification number. A complete census had been done and each village resident was also given an identification number based on the house number. From the census, complete lists were drawn up of all women from 15 to 49 years of age. They were interviewed in their homes with the whole team of field investigators sweeping systematically through the village. During the attitudes and beliefs survey each investigator was expected to interview four families per day.

4. Supervision and Quality Control

A senior member of the team of field investigators was appointed field supervisor. This individual was with the team in the villages at all times and carried a full load of surveys. In addition, the social scientist in charge was expected to make numerous spot checking visits. Every afternoon after returning from the field each investigator went through the forms

in detail to check for completeness and consistency.

5. Analysis of Attitudes and Beliefs

The analysis of attitudes and beliefs data is divided into five sections. The first section related to approval of family planning, the second to attitudes towards particular methods of family planning, the third to sources of information about family planning, the fourth to perceptions of child survival and child mortality, and the fifth to family size expectations and awareness of population trends. Finally a simple index is developed in an effort to define relative conservatism.

The general plan of presentation is as follows: first the distributions on the major variables obtained during the first and second surveys of interviews are given and important features of these distributions are noted. Next cross-tabulations of the personal attributes of respondents with attitudinal variables are presented. Finally associations of attitudinal variables with each other are analyzed.

a. Approval of Family Planning

Underlying other attitudes is the simple statement about whether respondents approved of family planning for a family like their own. Table II.C.1 gives responses in the first and second surveys by experimental group. The first important observation is that only a little more than half of the total study population approved of family planning and 28 percent disapproved. This is much lower than earlier surveys in India had reported and may be related to the general backlash against the mass IUD program just before the project started. Approval of family planning went up from the first survey to the second in each experimental group and disapproval of family planning decreased. The villages in the FP+WS+CC group started off with the lowest approval and highest disapproval of family planning. This coincides with other indications that this was probably the most conservative group of villages. The shift between surveys, however, was about the same in this group as in other groups. By contrast FP+CC started with the highest approval rates but had the least shift. Of particular interest to this experiment is the fact that between the two surveys the percentage

approving family planning increased and the percentage of those disapproving family planning decreased in the control group at least as much as in any other experimental group. This finding suggests either a high level of effectiveness of the government health center's motivational activities in these control villages, or a general subsiding of antipathy as rumors from the mass IUD program were forgotten.

Age does not seem to be related to approval of family planning. Caste, husband's education, and husband's occupation are, on the other hand, positively related to approval of family planning. The higher castes showed somewhat greater approval of family planning in both surveys. Husband's education showed a stronger association with the approval of family planning than the other variables in both surveys. In the first round, 57 percent of respondents whose husbands had ninth grade or lower education approved of family planning as compared with 72 percent of those whose husbands had more education. In the second survey these figures were 66 percent and 72 percent respectively (Table II.C.2).

Approval of family planning also seemed to be related to perception of whether infant and child mortality were decreasing. Table II.C.3 shows that of those who said that children are less likely to die now than thirty years ago, substantially more expressed approval of family planning than those who said that children are more likely to die now. However, the fact that 58 percent of those who said that children are more likely to die today than thirty years ago still approved of family planning, seems to support the notion that conscious perception of improved mortality is not a necessary condition for approval of family planning. The relationships did not change much during the second survey except that somewhat larger proportions approved of family planning. Almost exactly the same figures were obtained when the question was reversed for validation and respondents were asked for their perceptions of the chances of survival of children today compared to thirty years ago (Table II.C.4).

Surprisingly, the number of children that a family had living now seemed to have little relationship with approval of family planning. General approval of family planning was somewhat higher than the feeling that family

planning should be used by newlyweds. This finding may be part of a general cultural orientation to having a child soon after marriage to prove the fecundability of the couple. In spite of statements in demographic literature that in rural societies parents like to have their children soon and then stop, we found that an overwhelming proportion of people said they were in favor of spacing. In both surveys about 90 percent of the respondents said that children should be spaced.

The reasons given for approval of family planning were very general; for instance, open-ended questions produced statements about the advantages of small families but very few emphasized the disadvantages of large families. Relatively little importance was attached to health (3.8 percent) and economic reasons (0.7 percent) in the first survey. Perhaps as long as family planning approval is based on abstract advantages of small families there will be little incentive for rural couples to go to the trouble of contraception, whereas if large families were seen as being detrimental to the interests of the family at large or of the parents in particular, the response might greater.

b. Specific Methods of Family Planning

Pretests had shown that in the mid-1960's two contraceptive methods had particular attitudinal issues related to them and therefore most of the questions were focussed on IUDs and injectable contraceptives. An aggressive national and state IUD program had suffered a massive backlash that had a negative impact on all family planning. By contrast, we encountered many spontaneous expressions of desire for injections.

In the first sruvey almost 40 percent of the women said that they would like to be given injections as a method of contraception. Depo-Provera was introduced as one of our principal methods of contraception. During the second survey the percentage of those willing to accept injections dropped to 33 percent.

For IUDs there were strong opinions expressed about disadvantages and only 1.4 percent said there was no disadvantage. In the first survey 40 percent stated that excessive bleeding was the main disadvantage; two

other disadvantages cited were that it endangered health - 10 percent, and caused unspecified illness - 9 percent. In the second survey those mentioning excessive bleeding as a disadvantage of the loop decreased to 27 percent and those giving unspecified illness and endangering health as reasons also decreased substantially to 5 percent and 4 percent respectively. The effects of efforts to rehabilitate the IUD are indicated by the fact that in the second survey over 40 percent of women said they saw no disadvantage in the IUD.

c. Communication About Family Planning

A series of questions were asked regarding where people got information about family planning and with whom they talked. It is not surprising that the most important communication was between wives and husbands. Communication with husbands either about family planning or the number of children desired had a strong positive relationship with approval of family planning. In the first survey, of those women who said they had talked with their husbands about these matters 71 percent approved family planning while of those who had not talked with their husbands on either subject, only 37 percent approved of family planning. In the second survey the approval rate had increased to 84 percent and 54 percent respectively indicating that presumably even without talking to their husbands, women were more inclined to approve of family planning.

There were interesting differences among experimental groups in the proportion of women who said they talked with their husbands about family planning (Table II.C.6). If this can be considered an indication of relative sophistication it seemed important that the highest percentages (over 60 percent) were in the control and FP+CC groups. The lowest communication (41 percent) was in the FP+WS+CC group again indicating the relative conservatism of this group of villages. It is of interest but not readily explained that in all groups there was a decline between the first and second surveys in the percentage of women who said they talked with their husbands about family planning.

Our data did not show any clear relationship between having heard about family planning on the radio or other means of communication and approval of family planning. However, 60 percent of those who had heard about family planning on the radio had talked with their husbands while 65 percent of those who had not listened to family planning messages on the radio had also not talked with their husbands.

Husband's education was strongly and positively related to interspousal communication about family planning. Husband's occupation showed a similar relationship with those in service occupations or in business being more likely to communicate with their spouses about family planning than those who were agricultural workers or laborers. There was a moderate relationship between communication and caste. As in other studies, we found that age of the wife at marriage was positively related with communication with spouse. Women who were married at the age of 16 or older were subtantially more likely to have talked with their husbands about family planning than those women who were married at the age of 15 or younger.

d. Survival of Children

A major objective of this study was to test the child survival hypothesis: when parents perceive that the survival of children has increased they will be more likely to practice family planning and have fewer children. Because these are ephemeral attitudes and therefore difficult to measure, questions were asked in various ways to provide validation. For example, some of the questions asked were: "In your opinion, are there more or less or the same chances of survival of children as compared with thirty years ago?" and "Do you think more or less children die now than thirty years ago?" and "Considering the mortality among children, do you think it would be safer for people to have more children than they ultimately expect to survive?" "Considering the mortality among children, do you think you would like to have more children than you would expect to survive eventually?"

On the first survey, about one-third women respondents said that more children survive now, one-fifth said less survive, and 45 percent were uncertain (Table II.C.7). There was a paradoxical effect in that the

percentages of respondents who said that more children survive now and that fewer survive now both decreased from the furst survey to the second, while there was an increase in the percentage of those who said that the same numbers of children survive now as before and of those who were uncertain. The only exception was the FP+WS+CC group of villages where there was an increase from 23 percent to 32 percent in those who said children are more likely to survive now. Again, only in this group, the percentage of those who said they did not know declined.

Table II.C.8 presents the equivalent information when questions were asked in terms of mortality rather than survival. The results are similar including the paradoxical effect in all groups of villages except FP+WS+CC of a decline in the second survey in those saying less die now. In these comprehensive care villages the percentages saying mortality had gone down increased from 20 percent to 42 percent. One interesting difference between the two tables is that the numbers saying "don't know" was somewhat lower when the question was phrased in terms of mortality rather than survival. From the program point of view it seems important that the only true integration of family planning and child care was in FP+WS+CC. In the FP+CC villages the research needs of the Nutrition Project led to the child care services being under a male pediatrician and the family planning services under a woman physician with the result that the FHWs never achieved a synthesis of services or an effective use of entry points for family planning motivation, a process which was designed to make parents aware of improving child survival.

Those who said that survival was better today than thirty years ago were asked for reasons. The most frequent response was that there are more medicines and health facilities available now.

As with approval of family planning, age did not show any relationship with opinions about survival or mortality among children, but the three other personal characteristics of caste, husband's occupation and husband's education were positively related. Higher caste respondents more frequently said that survival of children had increased while lower caste respondents

were more inclined to give "don't know" as an answer (Table II.C.9). The results in the second survey remained virtually the same.

Some interesting intergroup differences emerged in the second survey when cross-tabulation of caste was related to whether child mortality was considered to have increased or decreased compared with the past (Table II.C.10) There was generally a greater awareness that fewer children were dying in villages where child care had been provided. It is particularly encouraging that this was most evident among the lower castes. Cross-tabulation of husband's education with perceptions of child survival (Table II.C.11) showed that 29 percent of those with no education said that survival had improved whereas 48 percent of those with 4.9 years of education or more gave the same response.

Table II.C.12 shows that in the first survey a higher percentage (68 percent) of those who thought that more children survive today than thirty years ago, had talked with their husbands about family planning. In the second survey, their percentage was somewhat lower. On the other hand, a similarly high percentage of those who were uncertain about whether more children were surviving than thirty years ago had not talked with their husbands about family planning in both first and second surveys (64 percent and 68 percent respectively).

The response to the questions about whether it would be safer for the respondent or for other people to have more children than they eventually expected to survive did not confirm the idea that people deliberately have more children as insurance against possible death. In the two surveys only 15 and 10 percent, respectively, of the village women (Tables II.C.13 and II.C.14) answered this question positively. This suggests that if the child survival hypothesis is an important motivational force, it will act through subconscious mechanisms rather than overt or conscious awareness.

If the effect of perception of child survival is a subconscious motivational mechanism, it is especially important to know how it affects motivation to use family planning. In the first survey (Table II.C.13) among those who said it was safer to have more children than would be expected to survive 53 percent approved of family planning and 33 percent

disapproved. Among those who said it was not necessary to have insurance births, the approval of family planning was much higher (70 percent) and the disapproval much lower (20 percent). Those who said "don't know" to the "insurance births" question were also much more likely to be uncertain about approval of family planning.

By the second survey there had been a distinct shift towards recognition that it was not necessary to have insurance births both among those who approved and disapproved of family planning with most of the shift coming from those who had said "don't know" earlier (Table II.C.14). The data by expprimental groups show that this shift was fairly uniform.

A further probing question asked whether respondents' opinion about child mortality affects the number of children they would like to have themselves. In Table II.C.15 it is apparent that those who were aware that less children die are much more likely to take this difference into account in thinking about their own family size. There is also a difference in experimental groups with the FP+WS+CC villages showing the maximum percentage of women giving a positive response (Table II.C.16).

e. Attitudes Toward Family Size

An ideal number of children of three or less was preferred by 55 percent of respondents; 77 percent felt four or less children were ideal. Although this may be considered favorable for national population goals it is also worth noting that 19 percent of the respondents in both the first and second surveys said that they had no idea as to what the ideal number of children should be for a family like theirs. Opinions of respondents about the ideal number of children for a family like theirs also remained the same in the first and second surveys. The data by experimental groups (Table II.C.17) shows that FP+WS+CC villages in both surveys had the largest percentage wanting four or more children (32 percent and 30 percent).

Because the AB survey was done in FP-Ed as a baseline only during the second round and because results were essentially the same as in NUT Other, the figures of these two groups were combined in all tables except Table II.C.17. It is evident that ideal family size is smaller in FP-Ed than in any other group. This difference in attitudes may help to explain the rapid acceptance of family planning in this group.

There was a clear direct relationship between ideal family size and numbers of children now living (Table II.C.18) suggesting that perceptions of ideal family size are strongly influenced by the number of children already born. An even more distinct direct relationship can be seen between stated ideal number of children and the number of liveborn children who had died in a family (Table II.C.19). Where ideal number of children was large they tended to have had a higher number of children die.

f. Relative Conservatism of Villages

Reference has been made at several points in this discussion to the relative conservatism of the various experimental groups as in indicator of readiness to change. In any attempt to explain these differences between experimental groups we could readily adjust for measurable demographic and socioeconomic variables, but possibly a more important issue we were interested in measuring was whether the groups were similar in their basic attitudes leading to approval or acceptance of family planning. We were also seeking for ways of measuring whether the service programs changed attitudes which might influence the acceptance of family planning and perhaps the general process of development.

A sense of fatalism is usually thought to be inconsistent with an acceptance of personal responsibility in planning for the future which in turn may affect attitudes to family planning and development. It happened that "God's will" emerged as a response to several different conditional questions in which reasons were elicited for particular attitudes to births, deaths, or demographic trends. A simple total of the number of time "God's will" was mentioned then seemed worth testing as an index of reliance on supernatural explanations.

In the first survey 61 percent of the respondents in FP+WS+CC invoked God's will at least once, 58 percent in both FP+WS AND FP+CC, 50 percent in NUT Other, and 56 percent in the controls (Table II.C.20). By the second survey, however, the responses had converged and all groups now had about 60 percent who never mentioned God's will.

Table II.C.1

APPROVAL OF FAMILY PLANNING BY EXPERIMENTAL GROUP--
COMPARISON OF FIRST AND SECOND SURVEYS

(ROW PERCENTAGE)

	SURVEY 1				SURVEY 2			
Group	N	Approve FP	Disapprove FP	Uncertain	N	Approve FP	Disapprove FP	Uncertain
FP+WS+CC	691	45	32	23	834	58	23	19
FP+WS	620	55	29	16	679	65	15	20
FP+CC	603	63	22	15	687	70	12	17
CONT-P	620	53	31	16	713	68	13	18
NUT OTHER	1,018	55	24	21	1,736	69	11	20
TOTAL	3,552	54	28	18	4,649	66	15	19

Table II.C.2

APPROVAL OF FAMILY PLANNING IN RELATION TO HUSBAND'S EDUCATION--
SECOND SURVEY IN ALL VILLAGES
(COLUMN PERCENTAGE)

	Husband's Education					
	0-Yrs.	1-3 Yrs.	4-9 Yrs.	10 + Yrs.	Unk.	Total
Approve FP	62	65	71	81	63	66
Disapprove FP	18	14	12	7	13	14
Uncertain	20	21	17	12	24	20
N	2,171	105	1,053	541	779	4,649

Table II.C.3

APPROVAL OF FAMILY PLANNING IN RELATION TO OPINIONS
ABOUT WHETHER MORE OR LESS CHILDREN DIE NOW
AS COMPARED WITH 30 YEARS AGO--BOTH SURVEYS IN ALL VILLAGES

(COLUMN PERCENTAGE)

	SURVEY 1			SURVEY 2		
	More Die Now	Less Die Now	Same	More Die Now	Less Die Now	Same
Approve FP	58	68	57	70	80	65
Disapprove FP	29	20	25	14	10	16
Uncertain	13	12	18	16	10	19
N	1,023	1,029	342	960	1,344	348

Table II.C.4

APPROVAL OF FAMILY PLANNING IN RELATION TO OPINIONS ABOUT CHANCES OF SURVIVAL OF CHILDREN AS COMPARED WITH 30 YEARS AGO--BOTH SURVEYS IN ALL VILLAGES

(COLUMN PERCENTAGE)

	SURVEY 1			SURVEY 2		
	More Survival	Less Survival	Same	More Survival	Less Survival	Same
Approve FP	70	57	55	81	71	62
Disapprove FP	20	30	29	8	16	17
Uncertain	10	13	16	11	13	21
N	1,179	708	65	1,222	697	286

Table II.C.5

APPROVAL OF FAMILY PLANNING IN RELATION TO WHETHER WOMEN HAD TALKED WITH THEIR HUSBANDS ABOUT FAMILY PLANNING--
BOTH SURVEYS IN ALL VILLAGES

(COLUMN PERCENTAGE)

	SURVEY 1		SURVEY 2	
	Had Talked with Husbands	Had Not Talked with Husbands	Had Talked with Husbands	Had Not Talked with Husbands
Approve FP	71	37	84	54
Disapprove FP	21	34	8	19
Uncertain	9	29	8	27
N	1,799	1,675	2,087	2,437

Table II.C.6

PERCENTAGES OF WOMEN WHO HAD TALKED WITH HUSBANDS
ABOUT FAMILY PLANNING BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGE)

	SURVEY 1			SURVEY 2		
Group	N	Had Talked with Husbands	Had Not Talked with Husbands	N	Had Talked with Husbands	Had Not Talked with Husbands
FP+WS+CC	685	41	59	815	34	66
FP+WS	613	52	48	664	44	56
FP+CC	590	60	40	673	46	54
CONT-P	607	60	40	664	53	47
NUT OTHER	979	49	51	1,683	50	50
TOTALS	3,456	52	48	4,524	46	54

Table II.C.7

OPINIONS ABOUT CHANCES OF SURVIVAL OF CHILDREN AS COMPARED WITH 30 YEARS AGO
BY EXPERIMENTAL GROUP, BOTH SURVEYS

(ROW PERCENTAGE)

	SURVEY 1					SURVEY 2				
Group	N	More Survive Now	Less Survive Now	Same	Uncertain	N	More Survive Now	Less Survive Now	Same	Uncertain
FP+WS+CC	691	23	19	1	57	834	32	13	6	49
FP+WS	620	35	19	2	44	679	24	15	7	54
FP+CC	603	42	20	3	35	687	27	16	8	49
CONT-P	620	31	26	2	41	713	22	18	5	55
NUT OTHER	1018	35	18	2	45	1736	26	14	6	44
TOTAL	3552	33	20	2	45	4649	26	15	6	53

Table II.C.8

OPINIONS ABOUT LEVELS OF MORTALITY OF CHILDREN AS COMPARED WITH 30 YEARS AGO
BY EXPERIMENTAL GROUP, BOTH SURVEYS

(ROW PERCENTAGE)

	SURVEY 1					SURVEY 2				
Group	N	More Die Now	Less Die Now	Same	Uncertain	N	More Die Now	Less Die Now	Same	Uncertain
FP+WS+CC	691	28	20	11	41	834	14	42	8	35
FP+WS	620	26	32	13	30	679	20	26	10	45
FP+CC	603	27	38	8	27	687	23	29	8	41
CONT-P	620	37	28	8	26	713	24	24	6	47
NOT OTHER	1,018	27	28	8	36	1,736	22	26	7	45
TOTAL	3,552	29	29	10	32	4,649	21	29	8	42

Table II.C.9

OPINIONS ABOUT CHANCES OF SURVIVAL OF CHILDREN
AS COMPARED WITH 30 YEARS AGO BY CASTE--FIRST SURVEY
(ROW PERCENTAGE)

Caste	N	More Survive Now	Less Survive Now	Same	Uncertain
Jat Sikh	1,631	38	18	2	42
Ramdasia	1,034	24	25	1	50
Other	545	37	19	1	43

Table II.C.10

OPINIONS ABOUT MORTALITY LEVELS COMPARING ONLY RESPONDENTS
WHO SAID MORE DIE NOW OR LESS DIE NOW BY CASTE GROUP
AND EXPERIMENTAL GROUP - SECOND SURVEY
(ROW PERCENTAGE)

	JAT			RAMDASIA			OTHERS			ALL		
GROUP	N	More Die	Less Die	N	More Die	Less Die	N	More Die	Less Die	N	More Die	Less Die
FP+WS+CC	263	21	79	130	32	68	73	33	67	466	26	74
FP+WS	148	35	65	96	60	40	61	36	64	305	43	57
FP+CC	152	39	61	118	54	46	81	41	59	351	44	56
CONT-P	179	41	59	121	61	39	36	50	50	336	49	51
NUT OTHER	503	41	59	200	59	41	111	43	57	814	45	55
TOTALS	1245	36	64	665	53	47	362	40	60	2272	42	58

Table II.C.11

OPINIONS ABOUT CHANCES OF SURVIVAL OF CHILDREN
AS COMPARED WITH 30 YEARS AGO BY HUSBAND'S EDUCATION--
FIRST SURVEY

(ROW PERCENTAGE)

Husband's Education	N	More Survive Now	Less Survive Now	Same	Uncertain
0	1,539	29	23	2	46
1-3	63	45	18	0	47
4-9	632	48	16	2	34
10-16	287	32	19	2	47

Table II.C.12

OPINIONS ABOUT CHANCES OF SURVIVAL OF CHILDREN
AS COMPARED WITH 30 YEARS AGO IN RELATION TO WHETHER WOMEN
HAD TALKED WITH THEIR HUSBANDS ABOUT FAMILY PLANNING--
BOTH SURVEYS IN ALL VILLAGES

(COLUMN PERCENTAGE)

	SURVEY 1				SURVEY 2			
	More Survive Now	Less Survive Now	Same	Uncertain	More Survive Now	Less Survive Now	Same	Uncertain
Talked with Husband	68	56	68	36	60	49	58	32
Did Not Talk with Husband	32	44	32	64	40	51	42	68
N	1,157	691	64	1,544	1,208	693	284	220

Table II.C.13

RELATIONSHIP BETWEEN APPROVAL OF FAMILY PLANNING AND RESPONSE ON WHETHER IT WOULD BE SAFER TO HAVE MORE CHILDREN THAN WOULD BE EXPECTED TO SURVIVE--ALL VILLAGES IN FIRST STUDY

(COLUMN PERCENTAGE)

	Safer to Have More Children	Not Safer to Have More Children	Don't Know	Total Column %
Approve	53	70	32	54
Disapprove	33	20	36	28
Uncertain	14	10	32	18
Total Row %	15	50	35	100
N	547	1,759	1,246	3,552

TABLE II.C.14

OPINIONS ABOUT WHETHER IT WOULD BE SAFER TO HAVE MORE CHILDREN THAN WOULD BE EXPECTED TO SURVIVE ACCORDING TO EXPERIMENTAL GROUPS - BOTH SURVEYS
(Row Percentages)

	Survey 1				Survey 2			
Group	N	Safer to Have More Children	Not Saver to Have More Children	Don't Know	N	Safer to Have More Children	Not Saver to Have More Children	Don't Know
FP+WS+CC	691	12	42	46	805	14	62	24
FP+WS	620	16	54	30	663	11	74	15
FP+CC	603	11	54	35	662	10	74	16
CONT-P	620	16	52	32	676	9	75	16
OTHER NUT	1018	19	48	33	1572	7	75	18
TOTALS	3552	15	50	35	4378	10	72	18

Table II.C.15

RELATIONSHIP BETWEEN OPINIONS ABOUT LEVELS OF MORTALITY OF CHILDREN AS COMPARED WITH 30 YEARS AGO AND WHETHER THIS DIFFERENCE INFLUENCES NUMBERS OF CHILDREN DESIRED--ALL VILLAGES IN SECOND SURVEY

(COLUMN PERCENTAGE)

	More Die	Less Die	Same
Difference Influences Decision	19	56	15
Does Not Influence Decision	48	26	28
Depends on Will of God	9	5	18
Unwilling to Think about Alternatives	14	8	17
Other	10	5	22
N	960	1,344	348

Table II.C.16

RESPONSES ABOUT WHETHER PERCEIVED DIFFERENCES IN CHILD MORTALITY INFLUENCE DESIRED NUMBER OF CHILDREN--
BY EXPERIMENTAL GROUP IN SECOND SURVEY

(ROW PERCENTAGE)

Village Group	N	Differences Influence Decision	Does Not Influence Decision	Depends on Will of God	Unwilling to Think about Alternatives
FP+WS+CC	523	50	31	9	10
FP+WS	333	38	43	10	9
FP+CC	359	40	38	12	10
CONT-P	337	36	38	12	14
NUT OTHER	878	38	40	7	15
TOTAL	2,430	41	38	9	12

Table II.C.17

OPINIONS ABOUT IDEAL NUMBER OF CHILDREN "FOR A FAMILY LIKE THEIRS" - BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGE)

	IDEAL NUMBER OF CHILDREN													
	SURVEY 1							SURVEY 2						
Group	N	1 or 2	3	4	5	6+	Uncertain	N	1 or 2	3	4	5	6+	Uncertain
FP+WS+CC	691	10	35	26	4	2	23	834	12	33	23	5	2	25
FP+WS	620	10	45	21	6	1	17	679	15	40	20	3	1	21
FP+CC	603	15	43	22	4	0	16	687	15	45	20	4	0	16
FP-Ed	-	-	-	-	-	-	-	731	20	48	14	2	1	15
CONT-P	620	12	49	19	4	0	16	713	16	41	20	3	2	18
NUT OTHER	1018	11	48	17	2	1	21	1005	17	43	18	4	1	17
TOTAL	3552	12	44	20	4	1	19	4649	15	41	20	4	1	19

Table II.C.18

RELATIONSHIP BETWEEN IDEAL NUMBERS OF CHILDREN
AND CHILDREN NOW LIVING--ALL VILLAGES IN SECOND SURVEY

(ROW PERCENTAGE)

		Ideal Number of Children					
Living Children	N	0-2	3	4	5	6+	Uncertain
0	438	21	40	16	2	1	20
1	382	20	47	14	3	1	15
2	431	19	45	19	1	1	15
3	481	5	50	24	3	1	17
4	457	9	29	39	6	1	16
5	353	9	35	16	12	2	25
6	255	9	30	25	5	4	27
7+	128	9	34	16	7	6	28

Table II.C.19

RELATIONSHIP BETWEEN IDEAL NUMBER OF CHILDREN
AND THE LIVEBORN CHILDREN WHO HAD DIED IN THE FAMILY--
SECOND SURVEY

(COLUMN PERCENTAGE)

	Ideal Number of Children					
Livebirths Who Had Died	0-2	3	4	5	6+	Uncertain
0	66	59	53	47	37	45
1	21	22	26	29	26	28
2-8	13	19	21	24	37	27
N	394	1,195	673	131	49	592

Table II.C.20

THE NUMBER OF TIMES GOD'S WILL WAS MENTIONED IN RESPONSES
TO CONDITIONAL QUESTIONS--BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGE)

	TIMES GOD'S WILL MENTIONED									
	SURVEY 1					SURVEY 2				
Group	N	0	1	2	3+	N	0	1	2	3+
FP+WS+CC	691	39	44	14	3	834	61	34	5	0
FP+WS	620	42	42	14	3	679	62	33	5	0
FP+CC	603	42	38	17	3	687	58	34	8	0
CONT-P	620	44	39	14	3	713	59	35	6	0
NUT OTHER	1,018	50	36	12	2	1,736	63	32	5	0
TOTAL	3,552	44	39	14	3	4,649	61	33	6	0

D. KNOWLEDGE AND USE OF DIFFERENT METHODS OF FAMILY PLANNING

Information on knowledge and use of the various methods of family planning was obtained in two cross-sectional surveys. The first was a baseline survey before services started and the second was about two years later. A third round had just begun when the project was terminated.

The survey methodology is described in the previous section dealing with attitudes and beliefs. In summary, however, a team of social science investigators progressed systematically through all households of the study villages completing the knowledge and practice form in the same interview session as the attitudes and beliefs survey. This included repeated return visits to suit the convenience of respondents, who were all married women 15-49 years of age. The interviewers identified themselves as being from the research project and not from the government but they clearly indicated that they had no health background. They did not attempt to use the resident FHW in the village to enhance rapport or to validate information. We had a unique capacity therefore to compare the two data sources to validate the usual systematic surveys as a source of KAP data. The investigators were women with master's degrees in social sciences and were supervised by a male social scientist.

Knowledge about methods of contraception was categorized into five levels: (1) never heard about the family planning method specified; (2) heard about the method but did not know how to use; (3) knew how to use the method but never used it; (4) used the method earlier but not currently using; and (5) currently using the method. The findings from the two rounds of surveys are presented for the major groups of family planning methods.

1. Conventional Contraceptives

For the conventional group of methods--condoms, foam tablet, cream and diaphragm--the five levels of knowledge-use status as reported by women are presented for each of the experimental groups in Tables II.D.1 - II.D.9. The overall proportion (all groups) who said that they never heard about these methods dropped from 50 to 38 percent between the first round and the second round survey. The drop in the proportion of women who reported that they did

not know how to use these methods was from 66 to 55 percent. The proportion of never-users, however, came down only from 92 to 86 percent. The current users increased from 2 to 5 percent.

The differential impact of services in different experimental groups as measured by indicators such as increments in the proportions currently using, ever-used, or knowing about these methods showed no dramatic differences

Since the method which had the greatest impact in this group of contraceptives was clearly condom it is important to realize that there was a large-scale national program promoting condoms (Nirodh) through widespread radio publicity, the use of commercial channels and also active promotion through the primary health center services. This undoubtedly is the main reason that the reported use rates were essentially the same in control villages and those receiving family planning services. Even with all of the publicity and availability, however, use only rose to about 7 percent.

2 Oral Pill

The knowledge-use status of the oral pill in the two rounds is of particular interest because of the numerous questions that have been raised in India about this method. There has undoubtedly been a bias against pills and it is hard to determine how much of this can be attributed to public resistance and how much to professional attitudes. Among our own staff the tendency was to offer all methods with as much of an even-handed approach as possible and to try to get an objective reflection of community response. Considerable variations developed among experimental groups and this was assumed at first to be due to biases among groups of workers. We saw no obvious effect from transferring FHWs between experimental groups and therefore became more interested in the possibility that local experience with methods seemed to develop a whole community climate based on gossip and rumore that needed much more study. The fact is that when we started work about 80 percent of persons in all these villages said they had never heard of pills and only 5-8 percent said they knew how to use them. In villages where RHRC family planning services were offered the proportion of women who said they had never heard of pills after two years of systematic exposure to family health worker contacts had dropped by 14-28 points,

while in villages which did not receive our family planning services the percentages had dropped only about 7-9 points. In some groups over 30 percent of women said they knew how to use the method but no one reported actual use. This seemed to confirm a general pattern of underreporting because our service data on current users collected longitudinally showed a use rate ranging around one percent at this time.

3. Intrauterine Device

By contrast, the knowledge and use of IUDs showed the impact of the mass campaign which peaked in the mid-1960s. Only 12 percent of women in the first survey said they had not heard of the method. Even this rate seemed high since there had been tremendous publicity, discussion of complications and strongly negative reactions. Our attempts to rehabilitate the IUD would seem to have been unproductive if we had only these survey results. The current user rate was reported to have declined from about 3 percent to roughly 1 percent, whereas from our longitudinal family planning information we know it stayed as high as 6 percent in some experimental groups. Interviewers reported that respondents seemed embarrassed to admit they were still using the method because of the continuing public feeling against it.

4. Injectable Depo-Provera

A dramatic difference was encountered in responses to injectable Depo-Provera. The attitude surveys showed great spontaneous interest in an injectable method. The method was included in this project as part of the ICMR national testing program. Since no injectable method had previously been available, no results are reported for the first round survey. In the second survey rapid work of mouth communication had produced a situation in which approximately 30 percent of women in service groups and about 60 percent of women in non-family planning service groups had never heard of the method. In the surveys reported use was 3-5 percent in service villages and our longitudinal data showed that 3-7 percent were getting injections regularly, indicating minimal underreporting for this method.

5. Non-Device Methods

Non-device methods of contraception such as safe period, withdrawal and abstinence are of particular interest because they are so deeply imbedded

in the traditional culture of the Punjab (Wyon and Gordon, 1971). Somewhat more than a quarter of women claimed not to know these methods in the baseline survey and this dropped only to slightly less than 20 percent in the second round. It is of some interest that those who said they were currently using these methods also dropped, and this was most marked in the villages where our family planning services had been offered--showing a clear substitution effect.

6. Sterilization

Survey data on vasectomy and tubectomy showed the lowest percentages of people saying they had never heard of these methods, which is congruent with the massive national campaign promoting them. The proportion using the methods approximately doubled and showed similar underreporting as with the other methods when compared with figures from the longitudinal family planning information.

7. Abortion

Data on induced abortion are of particular interest because of the law passed in 1971 to permit somewhat restricted access to abortion. The cultural reticence is shown by the fact that over one-third of women initially said they had never heard of abortions and this went up slightly in the second survey. However, use of abortion as a means of fertility control was not uncommon as determined by independent interviews of local practitioners and village midwives who used a wide assortment of mechanical and medicinal methods.

8. Other Methods

From the cultural point of view and as a reflection of community attitudes the data on knowledge and use of indigenous medicines and herbs is hard to interpret. Approximately a third of the people said they had never heard of these methods on the first survey, but this went up to well over two-thirds on the second one. On the other hand, the almost negligible proportions who said initially that they were currently using these methods increased to about 4 percent.

Similarly for manipulations such as washing, douching and getting out of bed to walk around a tree there was an increase in those saying they had never

heard of such methods from two-thirds to close to 90 percent. The percentages currently using them went down from about 5 percent to 2 percent. These data are of most interest because they give an indication of what was being done spontaneously or provided from non-project sources.

9. Reliability of Data

The problem of judging whether verbalized responses on use obtained through survey are complete or reliable is of methodological interest. The current-user rates reported in those groups of villages which received family planning services from project sources were consistently lower than the rates obtained from longitudinal data (FP acceptance data) collected under strict surveillance of those providing services. These surveys were done under optimum conditions with extremely well trained local interviewers and with a solid basis of rapport but minimum cross-contamination from service personnel. The fact that the data on family planning practice were so underreported in the service groups raises questions about all the surveys on which many policy decisions depend.

In order to estimate further the reliability of data, a person-by-person comparison of responses in the two survey rounds was made on women who were present for both surveys. From Table II.D.10 it may be seen that women who reported having heard about a method or methods in the first round frequently denied such knowledge in the second round. The proportion reporting this kind of inconsistency ranged from 12 to 46 percent for various methods of contraception. Of those who said they knew how to use a specific method the percentage who gave the same indication on the second survey ranged from 47 to 78 percent (Table II.D.11). Of those who reported earlier use of a particular method on the first survey, nearly half denied such use on the second survey (Table II.C.12). Of particular interest is the finding that of the persons who said they were currently using a method in the first survey, 62 to 85 percent later said they had never used that method (Table II.D.13).

Table II.D.1

REPORTED KNOWLEDGE AND USE OF CONVENTIONAL METHODS--CONDOM, FOAM TABLET, CREAM, DIAPHRAGM--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC	711	58	15	21	5	3	838	47	17	24	8	3
FP+WS	628	40	19	31	8	3	688	37	16	34	10	3
FP+CC	634	54	15	24	4	2	691	39	16	30	9	7
FP-Ed	-	-	-	-	-	-	719	32	14	37	10	7
CONT-P	637	45	15	30	8	2	717	33	22	32	10	4
NUT OTHER	883	50	18	23	7	3	998	40	17	32	8	4
TOTAL	3,492	50	16	25	6	2	4,651	38	17	31	9	5

*Definite responses only (The non-response rate to the questions in this and subsequent tables of this section averaged less than one percent.)

Table II.D.2

REPORTED KNOWLEDGE AND USE OF ORAL PILL--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC	717	82	10	7	0	0	830	68	11	19	3	0
FP+WS	627	84	9	7	0	0	685	56	8	33	3	0
FP+CC	622	80	12	8	0	0	683	64	10	25	1	0
FP-Ed	-	-	-	-	-	-	714	53	15	32	0	0
CONT-P	636	79	14	6	0	0	716	72	10	17	1	0
NUT OTHER	880	82	13	5	0	0	997	73	6	20	1	0
TOTAL	3,482	82	12	7	0	0	4,625	65	10	24	2	0

*Definite responses only.

Table II.D.3

REPORTED KNOWLEDGE AND USE OF INTRAUTERINE DEVICE (IUD)--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC	720	13	82	0	3	3	828	21	73	0	3	2
FP+WS	628	12	80	0	4	5	684	14	77	0	7	2
FP+CC	624	15	81	0	3	1	683	14	82	0	4	0
FP-Ed	-	-	-	-	-	-	716	12	81	0	7	0
CONT-P	637	9	82	0	7	3	710	13	80	0	7	1
NUT OTHER	882	12	79	0	7	3	996	14	78	0	7	1
TOTAL	3,491	12	80	0	5	3	4,617	15	78	0	6	1

*Definite responses only.

Table II.D.4

REPORTED KNOWLEDGE AND USE OF INJECTIONS--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1*						SURVEY 2					
Group	N**	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N**	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC							784	35	40	22	0	3
FP+WS							664	24	13	59	0	5
FP+CC							673	30	13	54	0	3
FP-Ed							715	37	24	38	0	1
CONT-P							710	60	15	24	0	0
NUT OTHER							989	58	10	32	0	0
TOTAL							4,535	42	19	37	0	2

*Injections not used at time of Survey 1.

**Definite responses only.

Table II.D.5

REPORTED KNOWLEDGE AND USE OF NON-DEVICE METHODS--SAFE PERIOD, WITHDRAWAL, ABSTINENCE--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC	721	24	2	29	19	26	837	28	4	31	21	17
FP+WS	628	26	2	35	15	23	687	22	3	37	19	20
FP+CC	624	31	2	27	17	24	688	17	1	38	21	23
FP-Ed	-	-	-	-	-	-	720	17	3	44	18	18
CONT-P	637	26	2	29	16	26	715	14	2	39	17	28
NOT OTHER	881	29	2	23	20	27	995	15	2	42	19	22
TOTAL	3,491	27	2	28	18	25	4,642	19	3	38	19	21

*Definite responses only.

Table II.D.6

REPORTED KNOWLEDGE AND USE OF STERILIZATION--VASECTOMY AND TUBECTOMY--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Using
FP+WS+CC	721	19	79	-	-	1	834	14	83	-	-	3
FP+WS	627	12	83	-	-	5	685	8	85	-	-	7
FP+CC	624	14	83	-	-	3	680	7	87	-	-	7
FP-Ed	-	-	-	-	-	-	717	4	89	-	-	7
CONT-P	637	10	86	-	-	4	716	5	91	-	-	4
NUT OTHER	882	10	86	-	-	4	997	5	87	-	-	8
TOTAL	3,491	13	83	-	-	3	4,629	7	87	-	-	6

*Definite responses only.

Table II.D.7

REPORTED KNOWLEDGE AND USE OF INDUCED ABORTION--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1					SURVEY 2				
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used**	N*	Never Heard	Heard Only	Knows Use	Earlier Used
FP+WS+CC	720	35	40	25		829	53	21	25	1
FP+WS	628	36	47	16		683	47	20	32	0
FP+CC	623	34	42	24		682	34	27	38	1
FP-Ed	-	-	-	-		720	30	20	49	1
CONT-P	637	35	48	17		711	28	35	36	0
NUT OTHER	880	41	45	14		991	36	29	34	1
TOTAL	3,488	37	44	19		4,616	38	25	37	1

*Definite responses only.

**"Earlier Used" not asked in 1st Survey.

Table II.D.8

REPORTED KNOWLEDGE AND USE OF OTHER METHODS--INDIGENOUS MEDICINES AND HERBS--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS (ROW PERCENTAGES)

	SURVEY 1						SURVEY 2					
Group	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Heard Only	Knows Use	Earlier Used	Currently Using
FP+WS+CC	719	34	-	64	2	0	837	77	4	12	4	3
FP+WS	627	31	-	67	2	-	686	76	5	13	3	3
FP+CC	621	30	-	68	2	0	688	68	5	17	5	5
FP-Ed	-	-	-	-	-	-	719	74	7	14	3	2
CONT-P	636	30	-	68	2	-	714	75	5	13	3	5
NUT OTHER	881	40	-	59	1	-	994	77	4	12	3	3
TOTAL	3,484	33	-	65	2	0	4,638	75	5	14	3	4

*Definite responses only.

Table II.D.9

REPORTED KNOWLEDGE AND USE OF OTHER METHODS--WASH, DOUCHE, SPONGE, GET OUT OF BED--
BY EXPERIMENTAL GROUP IN BOTH SURVEYS

(ROW PERCENTAGES)

	SURVEY 1					SURVEY 2				
Group	N*	Never Heard	Knows Use	Earlier Used	Currently Using	N*	Never Heard	Knows Use	Earlier Used	Currently Using
FP+WS+CC	721	65	23	8	5	837	89	9	1	1
FP+WS	628	60	28	8	5	686	87	10	1	2
FP+CC	624	60	25	8	7	688	85	11	1	3
FP-Ed	-	-	-	-	-	720	85	12	0	2
CONT-P	636	59	25	11	6	714	87	10	1	2
NUT OTHER	882	73	16	7	4	995	91	7	0	2
TOTAL	3,491	64	23	8	5	4,640	88	10	1	2

*Definite responses only.

Table II.D.10

DISTRIBUTION OF 2ND SURVEY RESPONSES OF THOSE WHO IN 1ST SURVEY SAID "HEARD" ABOUT METHOD(s)--ALL EXPERIMENTAL GROUPS

(ROW PERCENTAGES)

	RESPONSE IN SURVEY 2			
Method(s)	N*	Never Heard	Heard	Knows Use, Used Earlier, Currently Using
Condom, Foam Tab, Diaphragm	473	30	22	48
Oral Pill	337	46	12	42
IUD	2,318	12	85	4
Safe Period, Withdrawal, Abstinence	51	26	4	71

*Definite responses in Survey 2 only.

Table II.D.11

DISTRIBUTION OF 2ND SURVEY RESPONSES OF THOSE WHO IN 1ST SURVEY SAID THEY "KNOW HOW TO USE" METHOD(s)--
ALL EXPERIMENTAL GROUPS

(ROW PERCENTAGES)

	RESPONSE IN SURVEY 2			
Method(s)	N*	Never Heard, Heard Only	Know How to Use	Used Earlier, Currently Using
Condom, Foam Tab, Diaphragm	742	43	46	12
Oral Pill	192	53	44	3
IUD	-	-	-	-
Safe Period, Withdrawal, Abstinence	821	21	47	31

*Definite responses in Survey 2 only.

Table II.D.12

DISTRIBUTION OF 2ND SURVEY RESPONSES OF THOSE WHO IN 1ST SURVEY SAID THEY HAD "EARLIER USED" METHOD(s)--
ALL EXPERIMENTAL GROUPS

(ROW PERCENTAGES)

	RESPONSE IN SURVEY 2			
Method(s)	N*	Never Used	Used Earlier	Currently Using
Condom, Foam Tab, Diaphragm	177	40	42	18
Oral Pill	5	80	20	-
IUD	137	33	58	10
Safe Period, Withdrawal, Abstinence	498	46	30	24

*Definite responses in Survey 2 only.

Table II.D.13

DISTRIBUTION OF 2ND SURVEY RESPONSES OF THOSE WHO IN 1ST SURVEY SAID THEY WERE "CURRENTLY USING" METHOD(s)--
ALL EXPERIMENTAL GROUPS

(ROW PERCENTAGES)

	RESPONSE IN SURVEY 2		
Method(s)	N*	Never Used	Currently Using
Condom, Foam Tab, Diaphragm	78	62	39
Oral Pill	-	-	-
IUD	80	85	15
Safe Period, Withdrawal, Abstinence	727	63	37

*Definite responses in Survey 2 only.

E. VILLAGE PROFILES

Demographic and socioeconomic characteristics of the experimental groups of villages have been presented in a previous section. In order to briefly summarize the variations in these characteristics at the village level a limited profile of each village in the Population and Nutrition Projects has been developed in Tables II.E.1 through II.E.8. In addition to demographic and socioeconomic information based on 1972 data, distances to a few important places and a short descriptive comment have been included for each village. Maps of the study area showing the location of each village in relation to Narangwal, as well as more general relationships to Ludhiana District, the Punjab and India as a whole are given in Figures II.E.1-II.E.3. These data provide only a limited picture of some of the village level differences and similarities within and between the study groups. They may assist in interpreting some of the variation in results presented in this report. Detailed village level analyses that might take into account some of these factors in a more quantitative fashion are planned in the near future.

Figure II.E.1

MAP SHOWING LOCATION OF PUNJAB STATE IN INDIA

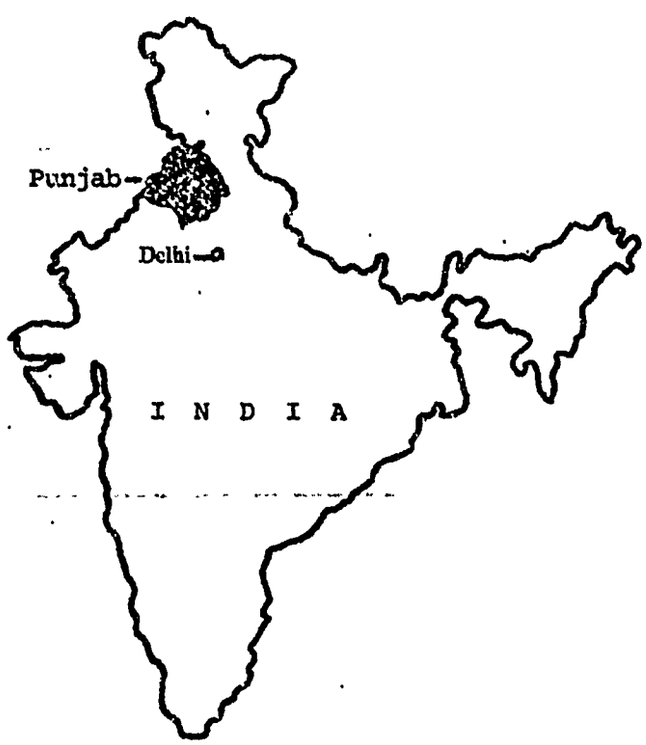


Figure II.E.2

MAP SHOWING LOCATION OF LUDHIANA DISTRICT

IN PUNJAB STATE

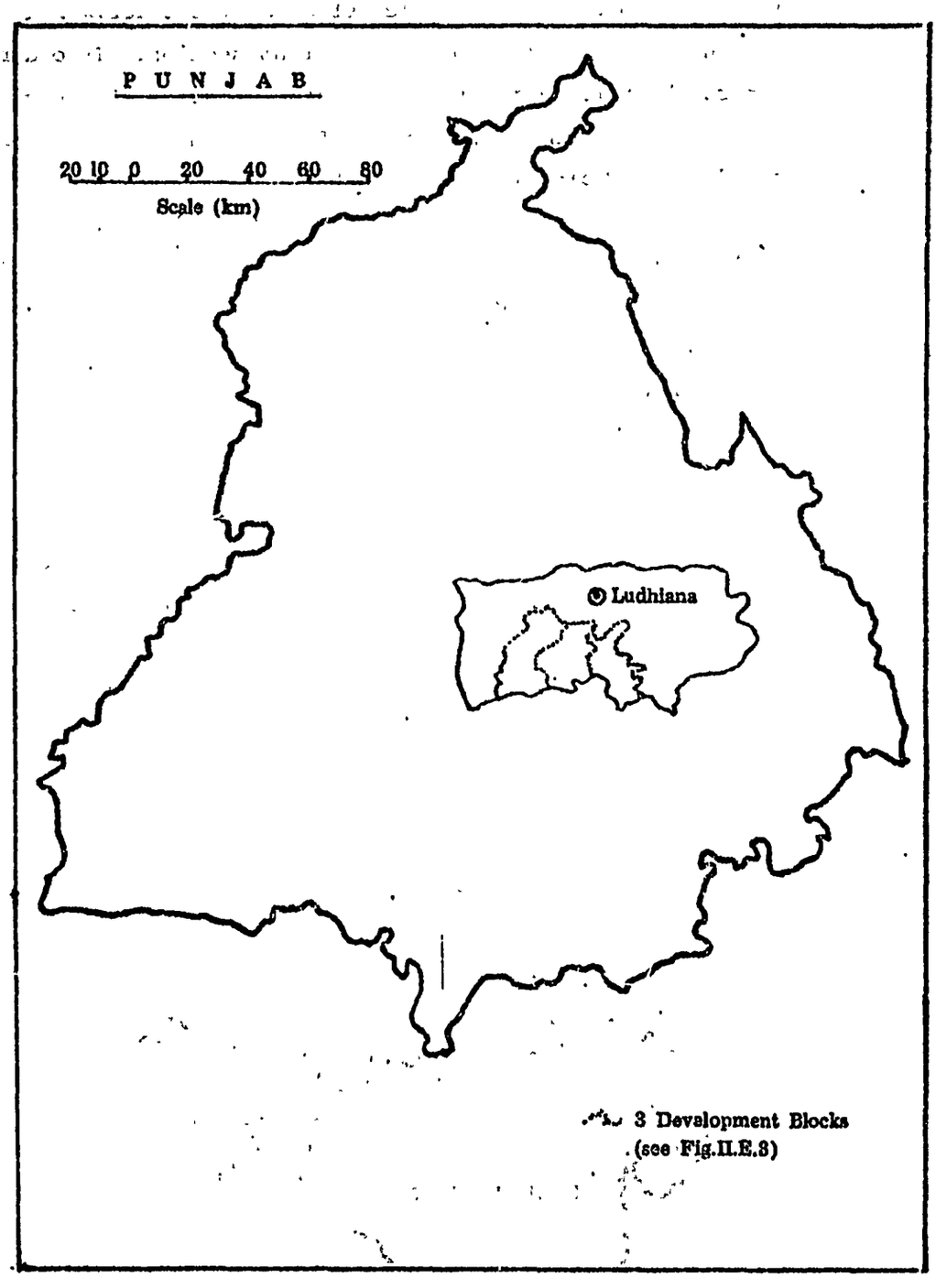
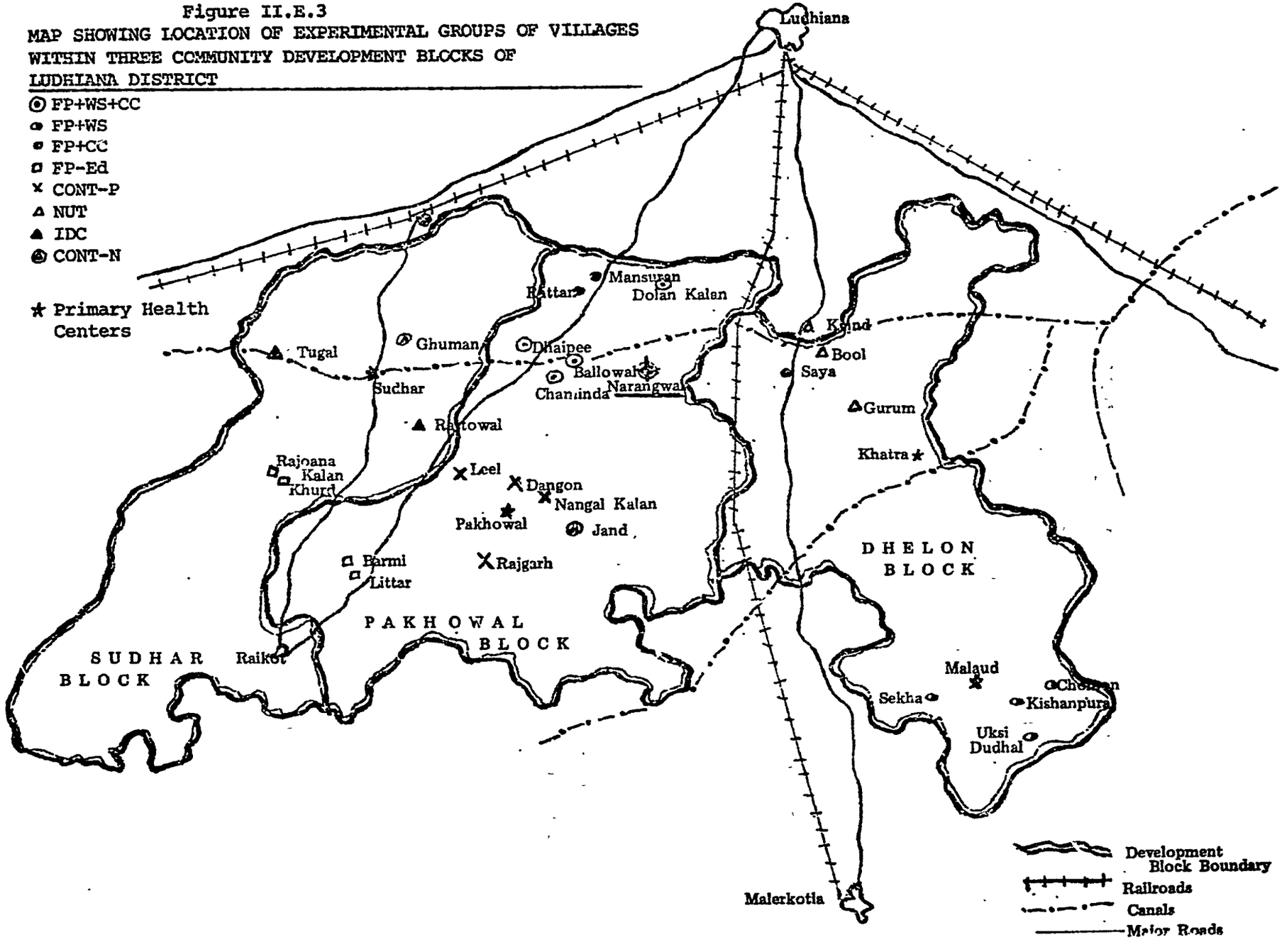


Figure II.E.3

MAP SHOWING LOCATION OF EXPERIMENTAL GROUPS OF VILLAGES WITHIN THREE COMMUNITY DEVELOPMENT BLOCKS OF LUDHIANA DISTRICT



1. FP+WS+CC EXPERIMENTAL GROUP OF VILLAGES

These villages were close to Narangwal and among the first to be selected for the study. Until 1965 there were no paved main roads near these villages leading to Ludhiana. By 1973, however, good main roads were available and were connected to each village by means of paved link roads.

BALLOWAL - The village leaders specifically requested we not provide family planning services when original discussions were carried out in this village. However, after other services were well under way these objections were removed. The panchayat raised money to construct a new sub-center building which became an object of considerable community pride.

CHAMINDA - This village also constructed a new sub-center building for use of the project and in a spirit of friendly competition later enlarged it to make it as big as the one at Ballowal.

DHAIPEE - The village provided an old building which was renovated by the project for a sub-center.

DOLON KALAN - Prolonged negotiations delayed the start of services in this village. The village leaders and the villagers themselves were less cooperative than in other villages throughout the project. They however did donate a village guest house for use as a sub-center.

Table II.E.1
GENERAL PROFILE OF VILLAGES IN THE FP+WS+CC EXPERIMENTAL GROUP

CHARACTERISTICS	Ballowal	Chaminda	Dhaipee	Dolon Kalan
POPULATION:				
Total	1499	1495	1720	1627
Sex Ratio ($\frac{M}{F}$ x 100)	111	115	119	119
% Married Women (15-49)	14.0	14.8	16.6	16.2
CASTE (%)				
Jat	46.9	48.8	49.0	47.9
Ramdasia	34.5	35.7	38.1	33.1
Other	18.6	15.6	12.9	19.1
HEAD OF HOUSEHOLD (%)				
Literate	37.3	42.3	32.5	24.1
Farmers	33.8	38.2	44.0	50.0
Laborers	36.6	34.5	35.9	31.1
Trade & Service	23.1	20.3	16.1	15.0
Other	6.6	6.9	4.0	3.8
HOUSING (%)				
All Mud	32.5	21.4	29.3	38.0
Pump in Courtyard	85.2	89.2	93.2	87.6
Lane Drains	67.4	71.3	25.5	4.5
Electricity	41.1	59.4	34.5	32.5
POSSESSIONS				
Own Radio (%)	22.6	28.7	20.9	23.9
Own Tubewell (%)	22.4	26.0	23.1	37.1
Use Tractor (%)	9.4	6.2	6.0	11.4
Median Value of All Possessions (Rs)	3316	3640	4322	4410
INCOME AND LAND				
Median Land Acreage* (Acrs)	3.1	5.3	5.2	6.1
Median Land Income* (Rs)	4167	5235	4079	5600
Median Non-Land Income (Rs)	1354	1241	1129	1514
Median Total Income (Rs)	1988	2303	1830	2393
IMPROVEMENTS DURING PROJECT PERIOD (%)				
Housing	20.4	18.8	11.0	30.6
Household	27.6	29.6	30.8	31.9
Agriculture	64.1	67.7	62.1	53.1
Any	75.1	79.6	70.9	71.3
DISTANCE IN MILES (Approx.)				
Narangwal	1	2	3	5
Ludhiana	15	15	15	12
Market Town	9	9	8	7
Primary Health Center	6	6	6	10
Other Health Facility	1	2	3	3
(Type) Teaching Health Center	Narangwal	Narangwal	Narangwal	Lalton

Note: Median values and percentage distribution (except % married women) are for households. Static data are from 1972.

* Median land acreage and income are only of those households owning land. Median non-land income and total income are of all households.

2. FP+WS EXPERIMENTAL GROUP OF VILLAGES

This group of villages was the most distant from Narangwal and was particularly chosen to be close to a government primary health center in order to match the control villages as much as possible. The general area in which the villages were located was originally a part of one of the princely states within Punjab prior to the independence of India. Historically, therefore, there were distinct differences between these villages and the other project villages.

Paved roads connecting these villages to the nearest main road were constructed during the time of the project.

CHOMON - The FHW who resided in this village also was the worker responsible for the adjacent village of Kishanpura.

SEKHA - A few leading families in Sekha attempted to influence the activities of the FHW, especially placing excessive demands on her time. Several times confrontation occurred between village factions related to attempts to have a particular FHW replaced.

UKSI-DUDHAL - This was the largest of the four villages in this group, actually being a combination of two villages separated by a road.

KISHANPURA - This village was served two days a week by the same FHW as Chomon. Although quite small, it was one of the more cooperative villages.

Table II.E.2

GENERAL PROFILE OF VILLAGES IN THE FP+WS EXPERIMENTAL GROUP

CHARACTERISTICS	Chomon	Sekha	Uksi-Dudhal	Kishanpura
POPULATION:				
Total	1191	940	2054	793
Sex Ratio ($\frac{M}{F}$ x 100)	116	108	111	120
% Married Women (15-49)	17.3	17.9	16.1	15.2
CASTE (%)				
Jat	47.7	46.6	40.4	45.2
Ramdasia	38.1	32.9	34.6	32.2
Other	14.2	20.5	25.0	22.6
HEAD OF HOUSEHOLD (%)				
Literate	26.4	36.8	25.7	26.0
Farmers	49.6	48.1	43.7	43.8
Laborers	31.1	29.2	34.0	38.2
Trade & Service	14.5	18.0	16.3	14.6
Other	4.8	4.6	6.0	3.5
HOUSING (%)				
All Mud	26.6	26.1	41.1	37.1
Pump in Courtyard	85.2	90.4	91.7	93.5
Lane Drains	31.1	58.5	50.0	30.7
Electricity	0.0	48.7	35.6	0.0
POSSESSIONS				
Own Radio (%)	25.0	30.9	26.8	23.8
Own Tubewell (%)	33.3	34.8	28.9	35.4
Use Tractor (%)	5.2	20.0	9.5	11.4
Median Value of All Possessions (Rs)	4444	3924	4315	4583
INCOME AND LAND				
Median Land Acreage* (Acrs)	7.0	7.3	9.4	6.4
Median Land Income* (Rs)	5192	5583	8295	4531
Median Non-Land Income (Rs)	1088	1182	1007	931
Median Total Income (Rs)	1950	2025	1850	1865
IMPROVEMENTS DURING PROJECT PERIOD (%)				
Housing	17.0	21.5	10.6	17.9
Household	33.3	29.0	25.8	19.2
Agriculture	62.6	53.3	62.7	64.1
Any	74.8	67.3	68.7	73.1
DISTANCE IN MILES (Approx.)				
Narangwal	15	13	16	15
Ludhiana	22	20	23	22
Market Town	8	7	5	6
Primary Health Center	1	1	2	1
Other Health Facility (Type)	-	-	-	-

Note: * See Table II.E.1

3. FP+CC EXPERIMENTAL GROUP OF VILLAGES

All the villages of this group were located directly on or near main roads leading to Ludhiana. They were selected early in 1967 as part of the nutrition study and then later were also incorporated into the population project.

MANSURAN - The largest of the three villages was Mansuran. Like many of our other villages it was affected by outmigration of all Muslims after the partition of India and Pakistan, but also had a later outmigration of many wealthy Hindu families to the city. (It was unusual in that it had a larger number of Hindu merchants than the other study villages.)

RATTAN - For its size, Rattan seemed to have the greatest number of problem families who at one time or another rejected services for their children. In contrast to Mansuran, the community was rather uninvolved in our program.

SAYA - This was another double village being made up of Saya Khurd and Saya Kalan. Saya Kalan was predominately a low caste village giving the total village of Saya the greatest proportion of Ramdasias of any study village (48%). Saya also had a large number of low caste families involved in a home weaving industry which gave them a somewhat higher income than most Ramdasias. Cooperation was generally quite good from families in the village as witnessed by the support given to an experimental day care program tried out during one harvest season.

Figure II.E.3

GENERAL PROFILE OF VILLAGES IN THE FP+CC EXPERIMENTAL GROUP

CHARACTERISTICS	Mansuran	Rattan	Saya
POPULATION:			
Total	2365	629	1920
Sex Ratio ($\frac{M}{F}$ x 100)	113	119	117
% Married Women (15-49)	15.7	14.2	15.4
CASTE (%)			
Jat	40.2	49.5	35.5
Ramdasia	36.5	37.4	47.7
Other	23.4	13.2	16.7
HEAD OF HOUSEHOLD (%)			
Literate	31.1	33.8	38.4
Farmers	37.6	44.8	24.9
Laborers	34.1	33.6	38.4
Trade & Service	22.6	18.2	29.9
Other	5.7	3.4	6.8
HOUSING (%)			
All Mud	21.1	28.0	16.1
Pump in Courtyard	91.4	90.7	96.4
Lane Drains	60.6	12.3	61.9
Electricity	48.5	29.5	39.2
POSSESSIONS			
Own Radio (%)	26.6	23.2	27.2
Own Tubewell (%)	21.5	33.3	17.0
Use Tractor (%)	20.4	23.4	12.4
Median Value of All Possessions (Rs)	3509	5176	3718
INCOME AND LAND			
Median Land Acreage* (Acrs)	4.6	6.0	4.6
Median Land Income* (Rs)	3438	9464	3958
Median Non-Land Income (Rs)	1766	1409	1654
Median Total Income (Rs)	2417	2722	2340
IMPROVEMENTS DURING PROJECT PERIOD (%)			
Housing	39.1	33.8	42.8
Household	32.2	26.5	28.8
Agriculture	54.8	64.7	56.8
Any	77.8	79.4	76.1
DISTANCE IN MILES (Approx.)			
Narangwal	3	3	5
Ludhiana	13	13	10
Market Town	6	6	7
Primary Health Center	9	9	7
Other Health Facility	3	3	2
(Type)	Tea.Hea.Ctr. Narangwal	Tea.Hea.Ctr. Narangwal	Govt. ANM Subcenter

Note: * See Table II.E.1

4. FP-Ed EXPERIMENTAL GROUP OF VILLAGES

The FP-Ed villages were the last to be selected and were about 45 minutes by car from Narangwal. Two of the villages still were not connected to main roads by paved link roads until the last year of the project. Although deficient in some indicators of social development, they were particularly well-off as agricultural villages with good farm income.

BARMI - Villagers in Barmi described their village as being more isolated than other of our villages, but they also claimed a large number of their men had been in the army or worked in large cities in India. Selection of a site for the sub-center was difficult because of a lack of vacant well constructed buildings. The sub-center was eventually placed in a new room adjacent to the courtyard of a tailor, a caste group that would be acceptable to most villagers.

RAJOANA KALAN - This village was built around a small fort dating back to the previous century. Rajoana Khurd split off from this village as a separate villages many years ago. In many ways it seemed that the innovators went to Rajoana Khurd and Rajoana Kalan remained more traditional in its outlook.

LITTAR - Littar was one of the few study villages with a high school in it.

RAJOANA KHURD - As mentioned above, Rajoana Khurd was a relatively newer village with strong and innovative agricultural households as witnessed by the relatively high use of tractors. Special features of the village included a government veternary dispensary and a retired government health officer (physician) practicing medicine in his home.

Table II.E.4
GENERAL PROFILE OF VILLAGES IN THE FP-Ed EXPERIMENTAL GROUP

CHARACTERISTICS	Barmi	Rajoana Kalan	Littar	Rajoana Khurd
POPULATION:				
Total	1841	1302	900	1486
Sex Ratio ($\frac{M}{F}$ x 100)	115	110	109	112
% Married Women (15-49)	15.4	15.0	15.3	14.6
CASTE (%)				
Jat	55.7	46.4	55.9	64.9
Ramdasia	27.6	37.1	38.5	22.2
Other	16.7	16.5	5.6	13.0
HEAD OF HOUSEHOLD (%)				
Literate	30.6	42.7	42.5	44.1
Farmers	52.0	41.6	53.9	60.7
Laborers	22.0	36.1	24.0	20.6
Trade & Service	21.2	16.1	18.0	13.2
Other	4.8	6.2	4.1	5.5
HOUSING (%)				
All Mud	30.8	45.7	29.9	29.6
Pump in Courtyard	95.7	87.2	99.1	96.4
Lane Drains	10.2	36.0	0.0	14.6
Electricity	18.6	32.7	0.0	37.1
POSSESSIONS				
Own Radio (%)	21.3	33.0	33.6	30.7
Own Tubewell (%)	32.2	23.5	38.8	34.8
Use Tractor (%)	22.2	19.8	35.8	35.9
Median Value of All Possessions (Rs)	4673	3699	5081	5862
INCOME AND LAND				
Median Land Acreage* (Acrs)	4.5	6.1	4.9	4.1
Median Land Income* (Rs)	3750	4999	5795	4886
Median Non-Land Income (Rs)	1256	1321	1158	1384
Median Total Income (Rs)	2654	1967	3000	3274
IMPROVEMENTS DURING PROJECT PERIOD (%)				
Housing	**	**	**	**
Household	**	**	**	**
Agriculture	**	**	**	**
Any	**	**	**	**
DISTANCE IN MILES (Approx.)				
Narangwal	11	11	10	10
Ludhiana	20	20	19	19
Market Town	3	3	3	2
Primary Health Center	5	6	5	5
Other Health Facility	3	1	3	2
(Type)	Government Dispensary	Govt. ANM Sub-center	Government Dispensary	Government Dispensary

Note: * See Table II.E.1

** No 1st Round Survey for comparison.

5. CONT-P EXPERIMENTAL GROUP OF VILLAGES

The villages of this group were selected so as to fall within a one-to-two mile radius of a primary health center (intensive coverage area). Until the early 1970's they were somewhat isolated since there were no main paved roads into the area where they were located. After 1970 a major road building campaign provided much easier access to the villages.

DANGON - Midway through the project the nearby primary health center was moved to a site bordering on the edge of this village. Before and after this move, Dangon was served by the primary health center staff much more intensively than the other control villages.

NANGAL KALAN - In 1971-1972 this village was selected by the primary health center as one of about 25 villages in the community development block to be visited by a multipurpose health team. This program involved an intensive one day campaign several times a year focussing on sanitation, malaria surveillance, small pox vaccinations and family planning. It supplemented routine continuing programs.

LEEL - This village was the most easily accessible of the control villages before 1970 being located on a subsidary irrigation canal. A government rest house for the overnight stay of any official visiting in the area was located on village land.

RAJGARH - The road between this village and the primary health center never was paved during the life of the project. The nearest market town was further away from Rajgarh than the primary health center but it was probably utilized for health care to a much greater extent.

Table II.E.5

GENERAL PROFILE OF VILLAGES IN THE CONT-P EXPERIMENTAL GROUP

CHARACTERISTICS	Dangon	Leel	Nangal Kalan	Rajgarh
POPULATION:				
Total	1669	1531	1067	1162
Sex Ratio ($\frac{M}{F}$ x 100)	110	107	113	104
% Married Women (15-49)	15.8	17.0	16.1	15.7
CASTE (%)				
Jat	50.6	46.9	51.3	51.6
Ramdasia	41.3	44.0	42.5	29.1
Other	8.1	9.1	6.3	19.2
HEAD OF HOUSEHOLD (%)				
Literate	30.6	42.3	32.7	35.9
Farmers	41.7	41.8	45.5	44.0
Laborers	40.7	22.8	27.9	25.1
Trade & Service	13.7	30.4	24.2	25.1
Other	3.9	5.1	2.4	5.8
HOUSING (%)				
All Mud	36.7	36.9	33.1	23.1
Pump in Courtyard	83.8	93.3	69.1	90.3
Lane Drains	55.1	10.5	21.4	63.8
Electricity	44.3	0.0	40.7	33.1
POSSESSIONS				
Own Radio (%)	28.3	29.3	22.3	33.7
Own Tubewell (%)	32.7	32.5	35.1	33.8
Use Tractor (%)	18.5	29.2	14.3	28.2
Median Value of All Possessions (Rs)	4606	3942	4087	4451
INCOME AND LAND				
Median Land Acreage* (Acrs)	5.8	6.7	7.1	5.8
Median Land Income* (Rs)	4861	5250	5531	4808
Median Non-Land Income (Rs)	1053	1309	1194	1310
Median Total Income (Rs)	1950	2059	1855	2222
IMPROVEMENTS DURING PROJECT PERIOD (%)				
Housing	43.5	0.7	24.2	33.0
Household	28.6	37.9	29.5	41.7
Agriculture	56.5	66.7	61.1	70.0
Any	77.4	75.2	78.9	81.7
DISTANCE IN MILES (Approx.)				
Narangwal	5	6	5	7
Ludhiana	20	20	21	22
Market Town	6	7	5	5
Primary Health Center	1**	1	1	2
Other Health Facility (Type)	-	-	-	-

*See Table II.E.1

** See opposite page for explanation

6. NUT Experimental Group of Villages

The villages in this group were part of the nutrition project and were located near the village of Saya. They therefore enjoyed relatively easy access to Ludhiana.

KAIND - This village had a much higher preponderance of Jats than the average village. It was the closest village to Ludhiana and was also near villages used as controls for the Khanna Study (Wyon and Gordon 1971).

BOOL - Services in this village were provided by the FHW resident in Kaind. It was located close to one of the main irrigation canals of the area.

GURUM - The village adjacent to Gurum was the headquarters of a government ANM who was particularly active in family planning. Gurum as well as the other two villages of this group were in general very cooperative and understanding in relation to the projects' efforts to provide only nutrition services and not medical care.

Table II.E.6
GENERAL PROFILE OF VILLAGES IN THE NUT EXPERIMENTAL GROUP

CHARACTERISTICS	Kaind	Gurum	Bool
POPULATION:			
Total	701	1486	658
Sex Ratio ($\frac{M}{F}$ x 100)	119	113	128
% Married Women (15-49)	14.8	14.6	14.2
CASTE (%)			
Jat	72.4	51.3	50.5
Ramdasia	11.4	31.9	27.7
Other	16.2	16.8	21.8
HEAD OF HOUSEHOLD (%)			
Literate	32.6	33.7	25.3
Farmers	52.4	46.9	49.4
Laborers	14.8	24.0	28.4
Trade & Service	26.9	24.6	18.5
Other	6.0	4.5	3.6
HOUSING (%)			
All Mud	12.1	20.0	32.3
Pump in Courtyard	91.6	92.5	82.6
Lane Drains	22.5	51.6	31.9
Electricity	58.4	42.7	40.5
POSSESSIONS			
Own Radio (%)	39.8	27.9	21.5
Own Tubewell (%)	46.6	34.3	32.5
Use Tractor (%)	24.4	28.0	25.3
Median Value of All Possessions (Rs)	5275	5010	5079
INCOME AND LAND			
Median Land Acreage* (Acrs)	7.2	5.5	7.4
Median Land Income* (Rs)	4250	4766	3958
Median Non-Land Income (Rs)	1276	1333	1409
Median Total Income (Rs)	2682	2583	2475
IMPROVEMENTS DURING PROJECT PERIOD (%)			
Housing	50.0	39.4	37.3
Household	34.3	23.0	19.4
Agriculture	48.6	56.4	52.2
Any	78.6	75.8	74.6
DISTANCE IN MILES (Approx.)			
Narangwal	6	6	6
Ludhiana	9	10	12
Market Town	8	8	8
Primary Health Center	8	5	7
Other Health Facility	2	1	1
(Type)	Govt. ANM Sub-center	Govt. ANM Sub-center	Govt. ANM Sub-center

*See Table II.E.1

7. IDC Experimental Group of Villages

The two villages of this group were more separated from each other than villages in any other group except the nutrition control. They were provided only child care services (infectious disease control-IDC) as part of the nutrition project.

TUGAL - This village was located adjacent to a main irrigation canal and a few miles west of an Indian Air Force base. The latter was an important influence in the area since a small bazaar and market area, including a movie house, had developed near the base.

RATTOWAL - In the early stages of the project this village was difficult to reach in the monsoon season because of flooded drainage ditches and bad roads. Later a paved road was built connecting the village to the bazaar area mentioned above, adjacent to the air base. The village sarpanch (headman) in Rattowal was well educated and particularly active in developing the local credit cooperative.

Table II.E.7

GENERAL PROFILE OF VILLAGES IN THE IDC EXPERIMENTAL GROUP

CHARACTERISTICS	Tugal	Rattowal
POPULATION:		
Total	1196	1615
Sex Ratio ($\frac{M}{F}$ x 100)	119	122
% Married Women (15-49)	14.6	14.0
CASTE (%)		
Jat	46.0	61.7
Ramdasia	31.6	28.1
Other	22.4	10.2
HEAD OF HOUSEHOLD (%)		
Literate	38.8	42.3
Farmers.	34.7	48.3
Laborers	40.3	29.5
Trade & Service	21.2	16.6
Other	3.8	5.6
HOUSING (%)		
All Mud	42.9	26.0
Pump in Courtyard	77.5	92.2
Lane Drains	68.6	70.6
Electricity	31.0	33.0
POSSESSIONS		
Own Radio (%)	20.1	29.4
Own Tubewell (%)	27.7	28.6
Use Tractor (%)	18.0	18.5
Median Value of All Possessions (Rs)	4459	4354
INCOME AND LAND		
Median Land Acreage* (Acrs)	6.1	3.8
Median Land Income* (Rs)	5813	4231
Median Non-Land Income (Rs)	1017	1140
Median Total Income (Rs)	1897	2196
IMPROVEMENTS DURING PROJECT PERIOD (%)		
Housing	27.0	41.0
Household	28.8	27.0
Agriculture	58.6	71.3
Any	75.7	81.5
DISTANCE IN MILES (Approx.)		
Narangwal	12	9
Ludhiana	18	17
Market Town	6	8
Primary Health Center	3	2
Other Health Facility (Type)	-	-

* See Table II.E.1

8. CONT-N Experimental Group of Villages

The control group for the nutrition project consisted of two widely separated villages.

GHUMAN - This village was within a mile of a primary health center and was served intensively by the staff of the center. It was named a model village by the government and therefore since 1970 has been the recipient of many special development inputs. Due to these atypical factors, data collected in this village was not used in the analysis of the nutrition study.

JAND - In many ways, Jand gave the impression of being typical of the average villages of the area. It was not on a main road or near any large towns. It was about equidistant from three government health facilities, the primary health center, an ANM sub-center and a small dispensary.

Table II.E. 8

GENERAL PROFILE OF VILLAGES IN THE CONT-N EXPERIMENTAL GROUP

CHARACTERISTICS	Ghuman	Jand
POPULATION:		
Total	1121	1157
Sex Ratio ($\frac{M}{F}$ x 100)	91	115
% Married Women (15-49)	17.7	15.4
CASTE (%)		
Jat	39.7	60.2
Ramdasia	39.2	21.5
Other	21.1	18.3
HEAD OF HOUSEHOLD (%)		
Literate	57.1	34.3
Farmers	35.5	59.1
Laborers	16.6	18.0
Trade & Service	40.3	19.3
Other	7.6	3.6
HOUSING (%)		
All Mud	11.5	17.1
Pump in Courtyard	98.7	91.9
Lane Drains	59.2	48.8
Electricity	48.8	0.7
POSSESSIONS		
Own Radio (%)	34.6	23.3
Own Tubewell (%)	23.3	38.2
Use Tractor (%)	14.0	25.6
Median Value of All Possessions (Rs)	3274	5110
INCOME AND LAND		
Median Land Acreage* (Acrs)	4.3	5.4
Median Land Income* (Rs)	3571	4375
Median Non-Land Income (Rs)	1571	1236
Median Total Income (Rs)	2048	2532
IMPROVEMENTS DURING PROJECT PERIOD (%)		
Housing	50.0	36.4
Household	23.1	22.4
Agriculture	65.7	77.6
Any	87.3	87.9
DISTANCE IN MILES (Approx.)		
Narangwal	9	6
Ludhiana	15	20
Market Town	6	5
Primary Health Center	1	3
Other Health Facility	-	3
(Type)		Govt. ANM Sub-C & Dis.

* See Table II.E.1

SECTION III

MEASUREMENT OF SERVICE INPUTS AND ACTIVITIES

SECTION III

MEASUREMENT OF SERVICE INPUTS AND ACTIVITIES

BACKGROUND

Field research involving the assessment of innovative health services or testing of specific health measures has usually relied mainly on measures of changed health status. Since it is often difficult to collect such outcome data, some projects have substituted intermediate measurements, such as numbers of services provided, as means of evaluation on the assumption that the effectiveness of such measures has already been demonstrated. In either case, such studies have rarely collected detailed information on service inputs or specific activities. Generally, they have been satisfied with overall descriptions of the services provided with some broad quantitative input data, for example, the amount and type of staff utilized, and perhaps some cost information.

As the services of the Narangwal project were being developed in the study villages we became increasingly aware that we would need to get much more detailed information on service inputs and activities than we had anticipated. We had planned for complete data on service outputs and outcome measures. Collection of the latter information included special mortality, morbidity, growth and development and fertility indicators as part of the original study design. We had thought that we could limit our input information to the usual practice of indicating that we had one worker per village, or per 1500 population. The obvious differences in the workload in the various experimental groups of villages made it apparent that we would need much more information on inputs and activities, as well as output measurements of services actually provided. Each service package for an experimental group was developed to provide varying combinations of children's services, women's services and family planning. The quantity of each of these components needed to be separated out and analyzed in order to identify resources utilized, their specific content, and their contribution to program impacts.

Methods for measuring these were developed and implemented after the project was under way, but as an integral part of the project. They were based on our previous research in developing a functional analysis methodology. This additional effort was justified both in providing a source of quantitative data for detailed input-outcome types of analyses as well as a means of developing and describing the service components which could be streamlined for eventual incorporation in replicable service packages for national health services. Within the framework of a research project such as Narangwal the development of service activities was intimately intertwined with special research, training and demonstration activities. Under these circumstances we decided we also needed data that would permit us to separate the proportion of effort and cost related to actual services rendered in the study population from the other research and training activities. This permitted a more rational analysis of program effects as a basis for making recommendations about the service packages relevant for government subcenters.

Specific studies were proposed with the following objectives:

(1) To measure quantitatively in terms of time, interpersonal contacts, and content the various activities of all RHRC staff involved in providing health and family planning services to study populations.

(2) To define the volume and source of non-RHRC health and family planning services provided to or utilized by the study population.

(3) To ascertain the costs of RHRC services and the proportions attributable to specific service components.

(4) To identify all services provided to individuals and communities and to relate this information to various outcome measurements.

A parallel research project had been started somewhat earlier (The Functional Analysis Project) to study government health centers in the Punjab, South India and Turkey. For this project, the Department of International Health had developed a number of data collection methods appropriate for the above objectives. Detailed input, activity and output data on government health centers were generated and then related to community health needs using a functional information matrix. This type of analysis was originally visualized as a planning and evaluation tool.

However it soon became apparent that the data collection methods could be easily adapted for use in research settings. One of the first practical applications of the functional analysis methods therefore was their adaptation and refinement for the Narangwal field experiment. In the summer of 1970, a pilot study was carried out in which the methods were modified and pretested to fit the research design. Actual data collection then began in January 1971 and continued until the close of the project.

A separate evaluation team with the acronym, FANS (Functional Analysis of Narangwal Services), was organized to collect the data. This team was kept as a distinct entity within the research project in order to insure flexibility and independence while collecting data that related to the performance of other project members. During the most intensive period of data collection one statistician, two assistant research officers (field supervisors), one assistant research officer (statistical supervisor), six field investigators (interviewers-observers), and at least six statistical assistant-coders were involved full time on the FANS team under the supervision of a project officer. The annual cost of the FANS evaluation peaked at about $25,000 or approximately 10 percent of the total annual local costs of the entire project (U.S. salaries and Baltimore costs excluded).

Four different data collection techniques were used to generate the FANS information: work sampling, service records analysis, health service utilization surveys and cost analysis. These techniques and a summary of their findings will be presented in the following sections.

A. WORK SAMPLING

Work sampling is the systematic observation and recording of the activities of workers, using an appropriate sampling framework. In this case instantaneous intermittent observations were made at two minute intervals throughout the observation periods. Simultaneous counts were kept of all observed service contacts carried out by the workers. In this fashion the following types of information were obtained:

(1) Input data - the amount of time spent by each category of worker carrying out his or her activities. This was calculated as input of time in minutes per 1000 population.

(2) Process data - the distribution of various activities and tasks among workers, or on an overall basis for the service package as a whole.

(3) Output data - a summary count of all types of service contacts and services generated by each worker.

It is difficult to collect this type of information accurately except by having observers follow workers over a long enough time to get a representative sample of their total work pattern. This raises the immediate question of whether the observer influences working patterns. It is virtually impossible to eliminate this effect entirely, but it can be minimized. At Narangwal, careful explanations were made to all staff and their cooperation was sought. The non-threatening intent of the study was emphasized, i.e., the results would not be used for evaluation of an individual's performance for administrative purposes. Repeated observations were made until workers got used to the presence of observers and this permitted any abnormal activities to revert towards more usual patterns.

1. Methods

a. Timing and sample design

The work sampling was done in two separate rounds:

1) The first round lasted for the entire year of 1971 and involved the observation of each service staff member for 24 full working days during the year. The year was divided into four quarters and within a quarter observations were made on each of the days of the week (6 days). Workers were grouped by their location in villages to simplify travel logistics for the observer team, and then the group of workers to be observed on any particular day was selected on a random basis keeping in mind the requirements for distributing days of the week. If for example a group was selected randomly to be observed on a Tuesday, but they had already been observed that quarter on a Tuesday, then the randomization process was continued until the first group needing a Tuesday observation came up. The observation schedule was worked out each quarter in advance, but was not communicated to the observers or workers until the week of the observation. Usually the observer gave the worker to be observed one day's

advance information that an observation was to be made in order to know where to meet in the field. When scheduled observations could not be made due either to unforeseen absence of the observer or worker, the soonest similar day of the week was used as a replacement observation day. The frequency of having to substitute observation days was about 20 percent.

2) The second round of work sampling was begun in December 1973 and was to have continued on a regular basis to the conclusion of the project. It was terminated in April 1974 when the project was closed prematurely. The sampling design was similar to the first round except that the observation days were spread out to provide 12 per worker in a year instead of 24. Thus each of the days of the week were to be observed every half year. In addition since there were six groups of workers in each location cluster, with six days of the week to be observed and six fortnights out of each half year available for observations, a six by six modified Latin Square was used to assign specific observation days. (During this phase of the project alternate fortnights were used for work sampling and household surveys.) The first half year of the sample design was approximately two-thirds completed when the project was closed, thus providing only on an average four observation days per worker in the second round. For the categories with greater numbers of workers, such as family health workers (FHWs), this was sufficient for analyses similar to the first round. However, for the other categories of workers only broad analyses supplemented by service records information could be made from second round data.

b. Forms and definitions

Special forms were developed for the work sampling observations which were based on previous experience in the Functional Analysis Project. Each form permitted the recording of 15 instantaneous type observations thus covering 30 minutes of observation time (one observation every two minutes). Each observation was categorized as follows:

1) Worker Type
2) Day and Date
3) Time of Day
4) Place

5) Individual Served (if any) - e.g., child under one month, etc.

6) Staff Contact (if any)

7) Function (Illness, Prevention, Maternity, Family Planning, or Nutrition)

8) Details of the Activity

The form allowed the observer to simply check the appropriate item under all of the above categories. Additional space was provided for a concise description of the details of the activity. The individuals being served were indicated in the observations only if they were physically present at the time of the observation (or if represented by a proxy, e.g., a mother of a child). Functions were defined as follows: Illness, Maternity and Family Planning functions included all activities in any way associated with care of ill persons, care associated with pregnancies (pre-, intra- and post-natal), and family planning respectively. The preventive function involved all preventive and surveillance activities including health and nutrition education, immunizations, routine checks, etc., unassociated with maternity care and family planning. The nutrition function in this case was defined only as those activities related to the feeding center program. All activities with a definable research component were identified so that they could be isolated at the analysis stage to estimate the research and normal service proportions of the field activities separately.

On the same form all individuals contacted by the worker were tallied during the 30 minutes covered by each form. These were categorized in much the same way as the instantaneous observations during the second round, but on the first round only very general total counts were made since it was assumed that the service record analysis would provide more detailed information.

c. Observations

All observations were carried out on a one-to-one basis, the observer following individual workers throughout all the working hours of the selected day. Observations began in the morning with the first activity of the day and continued until the worker indicated she or he had completed all the work for that day. Because of the irregular nature of emergencies no

observations were made outside of working hours. However, on the day of observation the worker was asked to recall all activities, such as emergencies, performed after the cessation of routine work the previous day and before work started on the observation day. This was recorded in a summary manner and provided a sample of "out of hours" work for analysis.

The workers were encouraged to go about their work in a normal fashion as if the observers were not there. The observers tried to remain as unobtrusive as possible staying in the background and communicating only when absolutely essential to clarify a particular observation. Observations were started at the first two minute mark following initiation of the workers' activities in the morning, and instantaneous observations were made every two minutes thereafter at the precise moment that the sweepsecond hand of the observer's watch passed 12. Only the activities occurring at that instant in time were to be recorded. Lunch break time was excluded, otherwise all other breaks in activity were recorded and categorized under "non-productive" time.

d. Training and quality control

Staff who were recruited as observers all had a master's degree in a social science and were fluent in English and Punjabi. Two had previously done work sampling in the Functional Analysis Project. On the basis of previous experience, it was felt that non-medical observers categorized activities more objectively than medically trained people, who tended to make more subjective qualitative judgements. All the staff were put through a rigorous month-long training course which included extensive field practice. After data collection started performance was monitored and retraining carried out as needed. Training and supervision were stressed as the main components of quality control since post-facto repeatability checks were not possible in this type of study. Simultaneous observation by the supervisor and the observer were part of supervision. The one independent quality check (other than internal consistency checks of the data) was the matching of appropriate items on the study forms with the observed worker's service records. Overall, approximately 5 percent of all items checked did not match between the observer's records and the worker's service records. This mismatch could have been due either to an error in observation or in the

worker's record. Obviously many important activity categories were not recorded in service records and could not be verified in this manner. In the long run the cooperation of service workers, intensive supervision and high esprit de corp of the FANS team were the main determinants of the excellent quality of the work sampling data.

e. Data processing

Completed observation forms were reviewed by the observers and then coded. The first round was coded by special coders while the observers coded their own forms on the second round. In either case a complete recheck of the coding was carried out by a system of switching forms among the coders and also by the statistician or project officer. All categorizations were checked for consistency and appropriateness against the descriptive phrase recorded. Consistency checks between service contact tallies and observations was also possible. When needed, clarifications were sought from the observer. This elaborate and intensive rechecking was required due to the complex nature of the activities observed and the need for categorization of multiple dimensions of the activities.

Following coding the data processing was straightforward using punch cards and magnetic tape. The first round generated over 125,000 IBM cards of data while the second round produced less than one-fifth as many.

2. Findings and Analysis

An important aspect of the analysis was to relate all the data collected to specific functions of the health and family planning services being studied. This provided a framework for assessing and comparing the services in the different experimental groups as well as a means of simplifying analysis of multiple activities, service-contacts and costs.

a. Analysis of time inputs and distribution by function

The first series of tables (III.A.1 through III.A.7) that follow deal directly with overall time inputs expressed as minutes per week of specific service functions provided to study villages per 1000 total population. The latter standardization to the population base has been essential due to the variations in population and staffing patterns of the

experimental [illegible] vided by each of the categories of service staff have been given separately and they were then totalled to show the entire service effort in each of the groups. In these tables the amounts of time have been separated into the time required for "replicable service" activities as compared with total effort (research and service time combined). When interpreting these results it must be remembered that the criteria for this separation of effort into service and research were developed by professional staff in the field on the basis of their best judgement of how routine functions might eventually be carried out. Actual service time required for a replicable service package would need to be determined by field trials. However, this analysis provides a first approximation of time that might be needed in a strictly service setting. The functional categories used in these tables have been previously defined in the description of methods. However, it would be well to mention at this point that the illness and preventive functions in these tables include all services for both women and children. In all the tables in which the functional categories have been presented the time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions. (Overall during work sampling about 50 percent of all observations could be categorized as being related to a specific function. This varied somewhat among types of staff being observed.)

The staff and their abbreviations have been described in earlier sections of this report. Two of the staff categories were not included in the work sampling. It was felt that the village attendants' (VA) activities were so limited and well defined they would not have to be observed. For completeness, however, estimates were made of their time inputs and included in tables III.A.1 - III.A.7 for comparison since their total time was such a substantial part of the overall efforts in villages where they were utilized. In subsequent tables the VA has been excluded. Social scientists also were not included in work sampling because their role was predominately research. Estimates of their service contributions were added to the appropriate functions of the staff they supervised (the FPWs and FPSs) in tables III.A.1 to III.A.21.

Tables III.A.1 - III.A.3 present the time inputs in the three experimental groups during 1971. The startling differences in total time inputs per 1000 population is very largely influenced by the inclusion of the VAs time in the groups providing child care. If their time is removed the total service as well as research and service time is almost identical for the FP+WS+CC and FP+WS experimental groups. The FP+CC is still left with over a third more service time and 50 percent more total time than either of the other experimental groups. This difference is related to the greater numbers of workers in this experimental group, especially the FHWs. In addition the increased PHN input partially compensates for the absence of the FHS. A number of important differences are also apparent when the effort by specific functions is examined. For example, total curative time was greatest in the FP+CC villages and mainly arising out of FHW activities in monitoring morbidity. The variation between the other two experimental groups is certainly due to the absence of child care services in the FP+WS experimental group. Preventive service time in the FP+WS is less than half the other experimental groups, whereas the maternity function was the highest in this group. The nutrition time input varied little between the two child care experimental groups due to comparable VA efforts. Possibly of greatest interest are the variations in family planning time. Overall FP+CC had more than twice as much family planning time input as FP+WS+CC, and FP+WS had one and a half the amount of FP+WS+CC. The physician and FPW inputs in FP+CC were the most important contributors since the FHWs in this experimental group spent less than half the time in family planning as compared with the FHW in the FP+WS experimental group. It was in the FP+CC group that a woman physician was assigned to family planning and a male physician to child care. Except for the FPW, very small amounts of family planning time were contributed by other workers in the FP+WS+CC group.

In 1971 the percentage of service time as compared to total research and service time was over 70 percent in the two strictly population study experimental groups and somewhat less for the FP+CC experimental group which overlapped with the nutrition research project. The function with the least service component (about 30 percent) was the preventive area in all experimental groups. The staff with the largest amounts of research time were generally PHNs and physicians. Exceptions to this were the FHWs in FP+CC and

FPW and PHN in FP+WS experimental groups. These variations are most readily explained by differences in time spent on specific longitudinal survey functions or time spent on records and reports, the latter often having a large research component.

Tables III.A.3 - III.A.7 repeat similar types of information as above for the second round work sampling in early 1974. Overall time inputs were slightly less than 1971 in the FP+WS+CC experimental group with service time decreasing more than research time. The FP+WS group also had a small decrease in service time, but an actual increase in total time inputs. The most significant drop occurred in the FP+CC experimental group where staffing and working patterns had been brought in line with the rest of the project after the termination of the nutrition project in mid-1973. The largest component of this change was the reduction in time for morbidity visits to children under 1 year from once a week to once every fortnight. Multiple changes occurred in staff input also, with some of the most significant changes involving decreases in time spent for service activities by the FHWs in FP+WS+CC and FP+CC. In the former group the drop was mostly in the illness function time whereas in FP+CC it affected a number of the functions. The doctors' time showed the largest drops in FP+CC and FP+WS. The decrease in FP+CC was greatest in the family planning function while in FP+WS it was associated with the illness function. In 1974 the FP+WS experimental group showed the greatest time inputs in family planning, having increased in this function substantially more than FP+WS+CC. The FP+CC experimental group actually had a drop in family planning time inputs, but they were still greater than the FP+WS+CC group. The FHWs in the child care experimental groups were involved in more curative service time than their counterparts in FP+WS. The FHWs in the latter group were much more occupied with maternity and family planning activities than the other FHWs. In addition they were the only FHWs who had increased their family planning time substantially between 1971 and 1974. To compound the differences in family planning inputs, while the FPWs family planning time was decreasing in the FP+WS+CC and FP+CC groups it was increasing in the FP+WS group. However, the FP+CC group in 1974 still had the highest level of FPW family planning time. The greater pressure on physician time meant that there was just less time available for the woman physician in the FP+CC group of villages.

Only one round of work sampling data is available for the FP-education experimental group since services were begun in those villages in 1972. Table III.A.7 gives the data for this group in 1974. The overall time inputs are very comparable to the other experimental groups with the total service time being a little less but remarkably close. Probably the biggest difference is in the physician's time input. The FPEs apparently were able to concentrate in family planning almost as much service time as the FHWs did in all their functions. Interestingly, the FPEs spent a little time on other functions, probably related to unavoidable situations where their advice was sought in these areas.

The proportion of service time to overall time dropped between 1971 and 1974 in all experimental groups except FP+CC where an increase in the FHWs service time compensated for the decrease in time of other staff. These changes were most pronounced for physicians, PHNs and FPWs. Possible explanations can be found in the deliberate shift in emphasis to progressive increase in village workers responsibilities. This was accompanied by the availability of fewer numbers of PHNs and physicians in 1974 with greater research loads on them and less time for service activities. The change in FPW time is directly related to their being involved in some special research surveys and processing of family planning data. The FP-education experimental group had the lowest proportion of service to total time, reflecting the relatively greater number of experimental approaches being tried out in that group.

From all of this detailed information it is quite apparent that multiple differences in input and various changes in inputs over time occurred in the research groups of the experiment. Further exposition of these differences at the functional level are provided in Tables III.A.8 - III.A.21. In these tables only the service data (research time excluded) have been transformed into percentage distributions of time spent by category of worker in different functions or by various staff within specific functions.

In tables III.A.8 - III.A.14 the manner in which the different categories of staff distributed their time is shown. For the staff as a whole the illness function was the predominant function except in the FP+WS group in 1974 and of course in the FP-Education group. The FP+WS group was therefore the only group that showed much change between rounds in this function.

The proportion of total staff time utilized for prevention, nutrition, and maternity care stayed fairly constant between 1971 and 1974 with differences between experimental groups being in the expected directions. The proportion of family planning increased about the same number of percentage points in the FP+CC and the FP+WS+CC groups, but jumped dramatically in the FP+WS group. In the FP-Education experimental group only 10 percent of total service time was not family planning related. In a way, since advice was about the only service provided in the other functions, this 10 percent could be considered as necessary rapport making contacts to facilitate family planning. It may be worth noting that FPEs were beginning to tell us after their first year in the village that they needed something more to take up with village women than just family planning. To maintain credibility they were insisting on getting involved in developing women's groups to carry out multiple socially desirable objectives.

Differences among staff of different experimental groups and between years of work sampling generally paralleled overall staff time differences. One of the more obvious changes between rounds, especially in the child care villages, was the decreased involvement of the FPW in functions other than family planning. In the earlier stages of the project when immunizations were given on a campaign or group basis the FPW had been utilized to assist in this program.

Tables III.A.15 - III.A.21 give the row percentages of the service time from the first set of tables (III.A.1 - III.A.8). Here the proportionate contribution of different types of staff to each function has been calculated. In all experimental groups the three peripheral types of workers (FPW and FHW or FPE) provided between 60 to 80 percent of the total effort in 1971 and 1974. The proportion of time provided by the physician decreased in the FP+WS and FP+CC experimental groups between rounds, approximating that in the FP+WS+CC in both rounds, while the contributions of the FHSs and PHNs remained about the same. These tables point out dramatically the shifting over time from the physician to the FHW of the illness function in the FP+WS experimental group and the family planning function in the FP+CC group.

b. Distribution of time between direct service and other activities

In addition to dividing time inputs into functions, this analysis has permitted separating the amount of time spent in giving direct care or service from other activities. Direct services were defined as those involving direct contact with individuals or groups. Other activities were either considered supportive in nature or non-productive. The latter was made up primarily of personal activities unrelated to work such as reading a newspaper or drinking tea. Supportive activities included contacts or interaction with other staff (e.g., training and supervision); preparation for service or maintenance of supplies; record keeping; other administrative activities; waiting and travel time. The first three of the supportive activities could occur simultaneously with direct service activities, but in the main were separate activities. However, they often overlapped each other such as supervision and record keeping.

The breakdown of data in the above fashion is given in tables III.A.22 through III.A.28 as percentages of total time for each worker category. (In these tables approximately 20-30 minutes per 1000 population of travel time per week for the FHW was added, representing travel time to and from Narangwal every fortnight for training sessions. It had not been possible to observe this particular travel during the work sampling observations.)

In 1971 the FP+WS+CC experimental group provided the greatest proportion of time as direct service compared with the other groups. The FP+CC group had the highest proportion of supportive activities and the FP+WS group the highest proportion of non-productive time. By 1974 all four experimental groups had nearly the same distribution of time with supportive services increasing proportionately in all groups. All categories of workers showed definite trends towards more effective use of their time. Substantial reductions in non-productive time occurred between work sampling rounds. This increase in productiveness is nicely illustrated by the change noted in the physicians' time. Physician time in all of the experimental groups showed a decrease in the proportion that was non-productive and a simultaneous increase in the direct service proportion, while the supportive activities proportion remained constant.

The various subcategories of supportive activities were remarkably constant between experimental groups and between rounds, except for record keeping. Across the board increases in the proportion of time spent in record keeping were noted in all experimental groups. These were linked primarily to changes in the physicians' time, PHNs and FPWs' record keeping time. The probable explanation for this was the earlier mentioned decrease in staff size and the assumption of greater research and report writing responsibilities by these staff.

c. Direct service time inputs

Once the direct service time was separated out it was further analyzed in relation to the functions involved as well as the type of individual served. In many respects this measurement of time is the most precise measurement of actual inputs into a community. It is certainly the visible part of any service package and is what is most likely to have an impact on attitudes of villagers and should be most directly related to changes in health status. Individuals served were divided into various age and sex groups and identified according to receipt of maternity care, family planning, or rapport type contacts. Most direct service was not considered research; therefore, no attempt was made to separate out the research components of these data.

Tables III.A.29 - III.A.31 present the direct service data for 1971 and include all staff except VAs and the social scientists. Due to the abbreviated work sampling in 1974 enough detailed data for this type of analysis was available only for FHWs and FPEs. These two categories comprise the staff in Table III.A.32. The total direct service time inputs parallel the differences and changes noted in the total function data. Declines in FHW direct service inputs are most marked in the FP+CC and FP+WS+CC groups. By 1974 the direct service time provided by the FHW or FPE were very comparable. The halving of child care time in the child care villages is probably the result of a deliberate simplification of service patterns for children in the FP+WS+CC group which occurred in mid-1972, and the marked change in FP+CC which occurred in 1973 when the nutrition studies were completed and research activities such as the weekly morbidity survey were stopped. FHW time devoted to women's services was similar in the

FP+WS and FP+WS+CC groups and these stayed relatively constant over time. Family planning time increased in all experimental groups between 1971 and 1974 but maintained about the same differences between experimental groups. In both rounds the FP+WS group had about double the amount of FHW time spent on family planning as in the FP+WS+CC group. The FP+CC group had the least family planning followup efforts in 1971 and in 1974.

Some concern was expressed in the women's services experimental groups about the amount of time spent treating "old ladies." They were included in the service program originally because it was thought that rapport with mothers-in-law might be important in getting compliance with family planning and preventive services for women of childbearing age and children. The time investment in listening to daily reports about arthritic joints led to unanswered questions about priorities and relative productivity since there was no evidence that the benefits did in fact go beyond whatever the treatment did for these patients. The data show that women over 50 years of age made up about 25 percent of all the time devoted to treating women's illnesses. This proportion did not change radically during the life of the project as will also be seen in the service records data.

d. Direct service contact counts

Work sampling provided an opportunity for the observer to record all services or service contacts provided by the worker being observed. At first it was assumed that these data would duplicate the type of data collected from the service records and would provide a good cross check between the two data collection methods. During the first round of work sampling, therefore, only gross counts of children, women and men receiving services was maintained for checking purposes. It soon became apparent, however, that many important contacts were never recorded on the service records. For example, non-routine followups of illnesses or family planning users associated with other activities was often only verbal and if there were no complaints no entry was made in the service record. This is a very natural occurrence in a village where the worker is resident and uses every fortuitous contact for furthering her work. With this better understanding of work patterns the data collected on the second round was categorized

much more adequately. Another difference between rounds which makes comparison with the service records somewhat difficult was the fact that contacts, especially for child services, included multiple functions or activities. Thus a child who was visited for a health check might also be treated for an illness. In the first round since only counts of children contacted were maintained, this type of multiple purpose visit would be counted only once. In the second round a contact was tallied for each purpose of visit. Therefore in 1971 the numbers reflected the actual visits to the home or clinic, whereas the 1974 data indicated the volume of different services provided. The latter permitted more detailed matching of contacts with the work sampling observation time.

Tables III.A.33 and III.A.34 show the direct service contact counts for 1971 and 1974 respectively. To make them comparable to the time input data they have also been standardized to a week of activity in a study population of 1000. In 1971 the FP+WS+CC experimental group received the greatest number of contacts from FHWs with the FP+WS group having the least. A much greater volume of child contacts was generated in FP+CC group, but surprisingly the FP+WS group received or requested fewer women's service contacts than the FP+WS+CC. This occurred in spite of the greater amount of time spent in direct women's services by FHWs in the FP+WS group. Apparently the amount of time per contact was greater in the latter experimental group. From the two sets of data it was calculated that the average time per women's services contact was about 3 minutes in the FP+WS+CC group and 4.5 minutes in the FP+WS group. The number of physician and FPW contacts were both the highest in the FP+CC group where they were extensively involved in child care.

Interestingly the number of contacts with men by FPWs seems quite small. These are counts of men who were actually given family planning advice or service. Most of the contacts with men were of a general ("non-specific") or rapport making nature in preparation for discussion of family planning at the appropriate time. These numbers match very well with the service records data.

Included in these tables also are counts of homes visited. In the latter data the more frequent homevisiting schedule of the FP+CC experimental group

is well demonstrated. In 1974 data for FHWs as compared with 1971 shows a decline in total service contacts in the two child care experimental groups, but an increase in the FP+WS group. Again this parallels the time input data. Details of the service contacts in 1974 are presented using the same categories as the direct service time with the FPEs from the FP-Education experimental group being included for comparison. Notably the number of contacts for family planning are almost as many in the FP+WS group as in the FP-Education group. The decline in numbers of child contacts between 1971 and 1974 was probably somewhat greater than shown due to the different method of counting contacts as mentioned previously. This shift did not occur in women's services and their overall volume remained quite stable except as noted in the FP+WS experimental group. In the second round of data collection the numbers of homes visited also was recorded and also showed a decline from 1971, except in the FP+WS group where it increased. Home visits that were attempted but not completed were also identified. The proportion of these unsuccessful household visits was relatively small in the health service experimental groups (10-15 percent) but over 30 percent in the FP-Education group.

e. Work outside regular hours

Emergencies were difficult to keep track of using the standard work sampling techniques without following the health workers 24 hours a day. However useful information was obtained on a recall basis as described in the methodology. The fact emerged that activities outside the usual working hours were not all emergencies. Health workers often made followup visits in the evenings or on weekends to patients who needed to be checked, given an injection or just reassured. These activities combined with true emergencies are presented very simply in Table III.A.35 as total time spent and total persons served or contacted. Because of the small volume of such data, no attempt was made to further categorize the activities. From the table it is quite apparent that child care services demanded a good bit more effort out of hours than women's services. Although it is not readily apparent these tables tend to confirm the low utilization of the FHWs for labor and delivery events which very often consume a great deal of time

outside of normal working hours. As mentioned in the section describing the women's services, this limitation of the FHWs activities was deliberate since routine deliveries were to be handled by dais. However, since we found that FHWs were not being called for complications as often or as quickly as they should have been, we were in the process of trying to modify this pattern of work when the project terminated. The time spent by the FHWs outside of working hours consisted mainly of contacts along the road on the way to work and some evening contacts with men who were not available during the daytime.

Finally, it is quite apparent that the physicians were not overloaded with emergency duties even though they were responsible for population units of about 10,000 people.

Table III.A.1

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+WS+CC EXPERIMENTAL GROUP, 1971--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF						
		VA	FHW	FPW*	FHS	PHN	DR	TOTAL
Illness	S	88	717	48	96	26	119	1094
	R+S	98	798	48	106	28	176	1254
Preventive	S	44	113	51	28	43	25	304
	R+S	227	348	117	78	104	66	940
Maternity	S	20	160	9	74	12	32	307
	R+S	23	192	10	93	31	52	401
Family Planning	S	10	77	230	18	11	34	380
	R+S	12	94	279	19	12	43	459
Nutrition	S	2029	55	2	36	12	7	2141
	R+S	2719	69	2	46	13	8	2857
Total	S	2191	1122	340	252	104	217	4226
	R+S	3079	1501	456	342	188	345	5911
	% S	71.2	74.8	74.6	73.7	55.3	62.9	71.5

*Includes 11 (S) and 13 (R+S) minutes of a social scientist's time supervising the FPW.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Key for abbreviations used in this or subsequent tables:

VA = Village Attendant
FHW = Family Health Worker
FPE = Family Planning Educator
FPW = Family Planning Worker
FHS = Family Health Supervisor
PHN = Public Health Nurse
FPS = Family Planning Supervisor
DR = Physician
S = Service component of time
R+S = Research and Service components combined

Table III.A.2

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+WS EXPERIMENTAL GROUP, 1971--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF					
		FHW	FPW*	FHS	PHN	DR	TOTAL
Illness	S	499	28	98	44	200	869
	R+S	558	28	103	44	300	1033
Preventive	S	82	3	34	10	3	132
	R+S	181	15	76	29	14	315
Maternity	S	294	15	110	51	72	542
	R+S	355	15	133	57	119	679
Family Planning	S	160	196	26	53	72	507
	R+S	212	355	33	62	95	757
Total	S	1035	242	268	158	347	2050
	R+S	1306	413	345	192	528	2784
	% S	79.2	58.6	77.7	82.3	65.7	73.6

*Includes 9 (S) and 17 (R+S) minutes of a social scientist's time supervising the FPW.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.3

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+CC EXPERIMENTAL GROUP, 1971 - SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 population)

FUNCTION		TYPE OF STAFF					
		VA	FHW	FPW*	PHN	DR	TOTAL
Illness	S	69	922	54	49	127	1251
	R+S	86	1144	56	109	186	1581
Preventive	S	41	218	55	19	20	353
	R+S	236	785	138	93	79	1331
Maternity	S	7	92	9	18	19	145
	R+S	8	99	13	19	29	168
Family Planning	S	11	138	450	27	232	858
	R+S	15	192	599	32	342	1180
Nutrition	S	2020	118	12	70	13	2239
	R+S	2629	153	12	97	15	2906
Total	S	2154	1488	580	213	411	4846
	R+S	2974	2373	818	350	651	7166
	% S	72.4	62.1	70.9	60.9	63.1	67.6

* Includes 13 (S) and 17 (R+S) minutes of a social scientist's time supervising the FPW.

** Approximately 50 minutes additional time for curative services was provided by the project officer (physician) in this group of villages only.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.4

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+WS+CC EXPERIMENTAL GROUP, 1974--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF						
		VA	FHW	FPW*	FHS	PHN	DR	TOTAL
Illness	S	85	549	4	76	28	102	844
	R+S	94	617	4	90	51	206	1062
Preventive	S	42	106	-	21	19	7	195
	R+S	218	168	-	35	47	21	489
Maternity	S	19	116	-	46	12	26	219
	R+S	22	145	-	69	14	42	292
Family Planning	S	10	98	198	43	29	41	419
	R+S	12	173	526	83	165	86	1045
Nutrition	S	1952	82	-	9	6	2	2051
	R+S	2615	134	-	16	21	6	2792
Total	S	2108	951	202	195	94	178	3728
	R+S	2961	1237	530	293	298	361	5680
	% S	71.2	76.9	38.1	66.6	31.5	49.3	65.6

*Includes 3 (S) and 9 (R+S) minutes of a social scientist's time supervising the FPW.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.5

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+WS EXPERIMENTAL GROUP, 1974--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF					
		FHW	FPW*	FHS	PHN	DR**	TOTAL
Illness	S	355	2	76	26	72	531
	R+S	390	2	94	34	144	664
Preventive	S	89	2	24	11	1	127
	R+S	172	2	41	26	3	244
Maternity	S	292	17	67	5	35	416
	R+S	342	19	95	7	57	520
Family Planning	S	291	212	138	69	49	759
	R+S	491	448	181	248	105	1473
Total	S	1027	233	305	111	157	1833
	R+S	1395	471	411	315	309	2901
	% S	73.6	49.5	74.2	35.2	50.8	63.2

*Includes 6 (S) and 12 (R+S) minutes of a social scientist's time supervising the FPW.

**Estimated by using changes in service patterns shown by the SRA data as well as service-research differentials for 1974 in other experimental groups. (Work sampling data for physicians in 1974 was not available in this experimental group.)

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.6

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP+CC EXPERIMENTAL GROUP, 1974--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF					
		VA	FHW	FPW*	PHN	DR	TOTAL
Illness	S	66	583	3	41	55	748
	R+S	83	652	3	63	115	916
Preventive	S	39	138	-	52	5	234
	R+S	227	222	-	107	15	571
Maternity	S	7	44	-	37	6	94
	R+S	8	52	-	61	10	131
Family Planning	S	11	159	332	75	63**	640
	R+S	14	215	645	281	134	1289
Nutrition	S	1948	45	-	9	12	2014
	R+S	2528	99	-	23	56	2706
Total	S	2071	969	335	214	141	3730
	R+S	2860	1240	648	535	330	5613
	% S	72.4	78.1	51.7	40.0	42.7	66.5

*Includes 6 (S) and 12 (R+S) minutes of a social scientist's time supervising the FPW.

**Work sampling data of the woman physician who provided family planning services in this experimental group in 1974 was inadequate. Estimates were therefore used based on SRA data as well as service-research differentials in other experimental groups.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.7

TIME SPENT PERFORMING DIFFERENT FUNCTIONS BY STAFF IN THE FP-ED. EXPERIMENTAL GROUP, 1974--SERVICE AND RESEARCH EFFORTS SEPARATED
(Minutes per Week per 1000 Population)

FUNCTION		TYPE OF STAFF					
		FPE	FPW*	FHS	FPS*	DR	TOTAL
Illness	S	78	13	16	3	-	110
	R+S	82	13	29	3	-	127
Preventive	S	15	-	2	-	-	17
	R+S	28	-	2	-	-	30
Maternity	S	21	-	-	-	-	21
	R+S	23	-	-	-	-	23
Family Planning	S	775	165	196	182	77	1395
	R+S	1318	418	392	395	259	2782
Total	S	889	178	214	185	77	1543
	R+S	1451	431	423	398	259	2962
	% S	61.3	41.3	50.6	46.5	29.7	52.1

*Includes 4 (S) and 10 (R+S) minutes of a social scientist's time supervising the FPW, as well as 25 (S) and 42 (R+S) minutes assisting the FPS in supervising the FP-Ed. experimental group.

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.8

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+WS+CC EXPERIMENTAL GROUP, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	63.9	14.1	38.1	25.0	54.8	49.4
Preventive	10.1	15.0	11.1	41.4	11.5	12.8
Maternity	14.2	2.8	29.4	11.5	14.8	14.1
Family Planning	6.9	67.6	7.1	10.6	15.7	18.2
Nutrition	4.9	0.6	14.3	11.5	3.2	5.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.9

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+WS EXPERIMENTAL GROUP, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	48.2	11.6	36.6	27.9	57.6	42.4
Preventive	7.9	1.2	12.7	6.3	0.9	6.5
Maternity	28.4	6.2	41.0	32.3	20.7	26.4
Family Planning	15.5	81.0	9.7	33.5	20.8	24.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.10

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+CC EXPERIMENTAL GROUP, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
Illness	62.0	9.3	37.1	30.9	43.9
Preventive	14.6	9.5	8.9	4.9	11.6
Maternity	6.2	1.5	8.4	4.6	5.1
Family Planning	9.3	77.6	12.7	56.4	31.5
Nutrition	7.9	2.1	32.9	3.2	7.9
Total	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.11

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+WS+CC EXPERIMENTAL GROUP, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	57.7	2.0	39.0	29.8	57.3	46.9
Preventive	11.1	-	10.8	20.2	3.9	9.5
Maternity	12.2	-	23.6	12.8	14.6	12.3
Family Planning	10.3	98.0	22.0	30.8	23.1	25.2
Nutrition	8.6	-	4.6	6.4	1.1	6.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.12

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+WS EXPERIMENTAL GROUP, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	34.6	0.8	24.9	23.4	45.9	29.0
Preventive	8.7	0.9	7.9	9.9	0.6	6.9
Maternity	28.4	7.3	22.0	4.5	22.3	22.7
Family Planning	28.3	91.0	45.2	62.2	31.2	41.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.13

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP+CC EXPERIMENTAL GROUP, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
Illness	60.2	0.9	19.2	39.0	41.1
Preventive	14.2	-	24.3	3.5	11.8
Maternity	4.5	-	17.3	4.3	5.2
Family Planning	16.4	99.1	35.0	44.7	37.9
Nutrition	4.7	-	4.2	8.5	4.0
Total	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.14

PERCENT OF TIME SPENT PERFORMING DIFFERENT FUNCTIONS
BY EACH TYPE OF STAFF AND TOTAL STAFF
IN THE FP-ED. EXPERIMENTAL GROUP, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					TOTAL
	FPE	FPW	FHS	FPS	DR	
Illness	8.8	7.3	7.5	1.6	-	7.1
Preventive	1.7	-	0.9	-	-	1.1
Maternity	2.3	-	-	-	-	1.4
Family Planning	87.2	92.7	91.6	98.4	100.0	90.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.15

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+WS+CC EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	71.3	4.8	9.5	2.6	11.8	100.0
Preventive	43.5	19.6	10.8	16.5	9.6	100.0
Maternity	55.7	3.1	25.8	4.2	11.2	100.0
Family Planning	20.8	62.1	4.9	3.0	9.2	100.0
Nutrition	49.1	1.8	32.1	10.7	6.3	100.0
Total	55.1	16.7	12.4	5.1	10.7	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.16

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+WS EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	57.4	3.2	11.3	5.1	23.0	100.0
Preventive	62.1	2.3	25.7	7.6	2.3	100.0
Maternity	54.2	2.8	20.3	9.4	13.3	100.0
Family Planning	31.6	38.6	5.1	10.5	14.2	100.0
Total	50.5	11.8	13.1	7.7	16.9	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.17

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+CC EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1971
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
Illness	78.0	4.6	6.7	10.7	100.0
Preventive	69.9	17.6	6.1	6.4	100.0
Maternity	66.7	6.5	13.0	13.8	100.0
Family Planning	16.3	53.1	3.2	27.4	100.0
Nutrition	55.4	5.6	32.9	6.1	100.0
Total	55.3	21.5	7.9	15.3	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.18

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+WS+CC EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	72.4	0.5	10.0	3.7	13.4	100.0
Preventive	69.3	-	13.7	12.4	4.6	100.0
Maternity	58.0	-	23.0	6.0	13.0	100.0
Family Planning	24.0	48.4	10.5	7.1	10.0	100.0
Nutrition	82.8	-	9.1	6.1	2.0	100.0
Total	58.7	12.5	12.0	5.8	11.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.19

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+WS EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
Illness	66.8	0.4	14.3	4.9	13.6	100.0
Preventive	70.1	1.6	18.9	8.6	0.8	100.0
Maternity	70.2	4.1	15.1	1.2	8.4	100.0
Family Planning	38.3	27.9	18.2	9.1	6.5	100.0
Total	56.0	12.7	16.6	6.1	8.6	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.20

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP+CC EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
Illness	85.5	0.4	6.0	8.1	100.0
Preventive	70.8	-	26.7	2.5	100.0
Maternity	50.6	-	42.5	6.9	100.0
Family Planning	25.3	52.8	11.9	10.0	100.0
Nutrition	68.2	-	13.6	18.2	100.0
Total	58.4	20.2	12.9	8.5	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.21

PERCENT OF THE TOTAL TIME SPENT ON EACH FUNCTION IN THE FP-ED. EXPERIMENTAL GROUP PROVIDED BY EACH TYPE OF STAFF, 1974
RESEARCH EFFORTS EXCLUDED

FUNCTION	TYPE OF STAFF					
	FPE	FPW	FHS	FPS	DR	TOTAL
Illness	70.9	11.8	14.6	2.7	-	100.0
Preventive	88.2	-	11.8	-	-	100.0
Maternity	100.0	-	-	-	-	100.0
Family Planning	55.6	11.8	14.1	13.0	5.5	100.0
Total	57.6	11.5	13.9	12.0	5.0	100.0

Note: Time spent in activities not specifically related to any function, such as travel time, has been proportionately allocated to each function using the distribution of time spent in performing actual functions.

Table III.A.22

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+WS+CC EXPERIMENTAL GROUP, 1971 ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
DIRECT SERVICE	45.7	22.0	11.1	10.3	17.4	32.8
SUPPORTIVE	43.0	53.8	71.4	65.7	64.8	51.7
NON-PRODUCTIVE	11.3	24.2	17.5	24.0	17.8	15.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	14.0	16.0	41.1	28.3	30.9	20.2
*Preparation-Maintenance	6.3	1.2	3.7	1.7	1.0	4.3
*Records	24.7	16.1	22.3	10.4	18.7	21.7
*Other Administration	2.4	1.1	3.3	2.5	3.9	2.5
*Waiting	1.2	0.6	0.9	1.2	1.7	1.1
*Transit	14.8	19.7	16.9	14.1	14.9	15.8

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.23

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+WS EXPERIMENTAL GROUP, 1971 ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
DIRECT SERVICE	39.5	28.5	17.3	2.7	16.4	28.7
SUPPORTIVE	37.3	43.1	53.6	86.9	69.0	49.2
NON-PRODUCTIVE	23.2	28.4	29.1	10.4	14.5	22.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	14.0	12.0	36.7	31.8	16.4	18.5
*Preparation-Maintenance	7.3	1.2	2.1	0.7	0.8	4.4
*Records	20.5	25.6	16.1	7.7	11.9	18.1
*Other Administration	2.0	0.7	4.6	4.6	1.0	2.2
*Waiting	1.2	0.4	0.7	1.3	1.0	1.0
*Transit	14.6	18.4	16.0	19.2	21.6	16.7

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.24

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+CC EXPERIMENTAL GROUP, 1971
ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
DIRECT SERVICE	36.1	22.1	7.2	10.3	27.0
SUPPORTIVE	51.5	44.5	79.0	68.9	54.8
NON-PRODUCTIVE	12.4	33.4	13.8	20.8	18.2
TOTAL	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	17.3	15.6	52.2	21.8	20.3
*Preparation-Maintenance	6.7	1.2	1.2	0.6	4.2
*Records	26.9	17.1	25.9	6.2	21.6
*Other Administration	3.5	2.6	7.6	1.0	3.3
*Waiting	1.1	0.4	1.2	1.9	1.1
*Transit	15.0	18.1	15.5	15.4	15.7

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.25

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+WS+CC EXPERIMENTAL GROUP, 1974 ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
DIRECT SERVICE	37.2	24.5	21.8	3.9	24.9	30.6
SUPPORTIVE	56.1	64.1	70.2	89.7	65.1	61.6
NON-PRODUCTIVE	6.7	11.4	8.0	6.4	10.0	7.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	19.1	10.1	50.9	34.3	38.4	24.8
*Preparation-Maintenance	8.3	0.7	0.8	1.0	1.1	5.3
*Records	26.1	33.9	36.4	30.9	19.9	27.8
*Other Administration	2.6	0.9	1.5	6.9	8.5	3.2
*Waiting	7.2	2.0	3.4	2.0	10.4	6.2
*Transit	11.6	12.9	14.1	9.3	16.8	12.5

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.26

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+WS EXPERIMENTAL GROUP, 1974
ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF					
	FHW	FPW	FHS	PHN	DR	TOTAL
DIRECT SERVICE	31.0	13.5	34.8	4.2	24.9	27.4
SUPPORTIVE	61.6	72.5	55.1	89.9	65.2	63.9
NON-PRODUCTIVE	7.4	13.9	10.1	5.9	9.9	8.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	10.8	13.1	25.6	36.0	38.4	17.4
*Preparation-Maintenance	5.8	0.4	4.4	1.6	1.0	4.3
*Records	24.7	41.8	25.6	58.2	19.9	28.5
*Other Administration	2.3	0.8	1.9	10.6	8.5	3.1
*Waiting	9.9	0.8	6.5	1.6	10.4	7.7
*Transit	13.1	16.4	14.3	11.1	16.8	13.9

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.27

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP+CC EXPERIMENTAL GROUP, 1974
ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF				
	FHW	FPW	PHN	DR	TOTAL
DIRECT SERVICE	39.6	17.8	7.8	26.3	30.1
SUPPORTIVE	55.8	63.8	79.4	67.2	61.4
NON-PRODUCTIVE	4.6	18.4	12.8	6.5	8.5
TOTAL	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	13.1	16.5	40.1	44.6	19.9
*Preparation-Maintenance	5.7	1.8	1.4	5.2	4.4
*Records	26.4	48.2	47.4	34.9	34.1
*Other Administration	2.1	1.3	8.1	9.4	3.3
*Waiting	5.9	1.1	2.8	4.1	4.4
*Transit	18.3	11.4	9.2	16.7	15.7

*These activities are related either to "Direct Service" or "Supportive." They mal also overlap each other.

Table III.A.23

PERCENT OF TIME SPENT PERFORMING DIRECT SERVICE, SUPPORTIVE OR NON-PRODUCTIVE ACTIVITIES, INCLUDING SPECIFIC COMPONENTS OF THESE ACTIVITIES, BY STAFF IN THE FP-ED. EXPERIMENTAL GROUP, 1974
ALL RESEARCH TIME EXCLUDED

ACTIVITY	TYPE OF STAFF					
	FPE	FPW	FHS	FPS	DR	TOTAL
DIRECT SERVICE	28.2	21.8	24.7	8.3	16.1	24.3
SUPPORTIVE	66.9	64.0	70.0	81.6	75.8	69.0
NON-PRODUCTIVE	4.9	14.2	5.3	10.1	8.1	6.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
*Staff Interaction	9.8	12.3	41.8	19.2	14.5	15.8
*Preparation-Maintenance	2.7	1.4	2.1	0.9	1.7	2.2
Records	39.9	43.1	26.1	52.0	4.9	37.8
*Other Administration	1.3	1.4	2.4	1.8	6.4	1.8
*Waiting	2.8	1.9	5.6	2.2	3.2	3.1
*Transit	16.8	12.3	16.5	17.4	27.4	16.8

*These activities are related either to "Direct Service" or "Supportive." They may also overlap each other.

Table III.A.29

TIME SPENT PERFORMING DIRECT SERVICE ACTIVITIES BY STAFF IN THE FP+WS+CC EXPERIMENTAL GROUP, 1971--SERVICE AND RESEARCH COMBINED
(Minutes per Week per 1000 Population)

	DIRECT SERVICE	TYPE OF STAFF					
		FHW	FPW	FHS	PHN	DR	TOTAL*
CHILDREN	Illness <1 yr.	42	1	4	-	2	49
	1-2 yrs.	69	1	2	1	4	77
	3+ yrs.	76	-	3	1	2	82
	Preventive <1 yr.	33	7	2	2	2	46
	1-2 yrs.	46	6	4	4	3	63
	3+ yrs.	4	-	3	4	1	12
	Nutrition	5	-	1	-	-	6
	Subtotal	275	15	19	12	14	335
WOMEN	Illness <50 yrs.	147	2	6	1	14	170
	50+ yrs.	41	-	2	-	5	48
	Preventive	29	-	-	-	1	30
	Antenatal	46	1	3	1	4	55
	Labor and Delivery	3	-	-	-	1	4
	Postnatal	12	-	1	-	1	14
	Subtotal	278	3	12	2	26	321
FAMILY PLANNING	Preacceptance	11	20	1	1	1	34
	Contraceptive Services	9	6	-	-	2	17
	Follow-Up	9	3	-	-	1	13
	Subtotal	29	29	1	1	4	64
MEN--Illness		8	7	1	-	1	17
RAPPORT		65	45	5	2	3	120
TOTAL		655	99	38	17	48	857

*Excludes time of village attendants and social scientist.

Table III.A.30

TIME SPENT PERFORMING DIRECT SERVICE ACTIVITIES BY STAFF IN THE FP+WS EXPERIMENTAL GROUP, 1971--SERVICE AND RESEARCH COMBINED
(Minutes per Week per 1000 Population)

	DIRECT SERVICES	TYPE OF STAFF					
		FHW	FPW	FHS	PHN	DR	TOTAL*
CHILDREN	Illness <1 yr.	2	1	1	-	1	5
	1-2 yrs.	4	-	1	-	1	6
	3+ yrs.	2	-	-	-	1	3
	Preventive <1 yr.	6	1	1	-	-	8
	1-2 yrs.	-	-	-	-	-	-
	3+ yrs.	-	-	-	-	-	-
	Nutrition	-	-	-	-	-	-
	Subtotal	14	2	3	-	3	22
WOMEN	Illness <50 yrs.	156	2	14	2	29	203
	50+ yrs.	27	-	2	-	6	35
	Preventive	36	-	1	-	2	39
	Antenatal	69	2	5	1	7	84
	Labor and Delivery	16	-	-	-	1	17
	Postnatal	15	-	3	-	1	19
	Subtotal	319	4	25	3	46	397
FAMILY PLANNING	Preacceptance	19	20	1	1	1	42
	Contraceptive Services	14	2	-	-	3	19
	Follow-Up	16	2	-	-	2	20
	Subtotal	49	24	1	1	6	81
MEN--Illness		3	4	-	-	1	8
RAPPORT		99	59	27	1	6	192
TOTAL		484	93	56	5	62	700

*Excludes time of village attendants and social scientist.

Table III.A.31

TIME SPENT PERFORMING DIRECT SERVICE ACTIVITIES BY STAFF IN THE FP+CC EXPERIMENTAL GROUP, 1971--SERVICE AND RESEARCH COMBINED
(Minutes per Week per 1000 Population)

DIRECT SERVICES		TYPE OF STAFF				
		FHW	FPW	PHN	DR	TOTAL*
CHILDREN	Illness <1 yr.	135	-	2	5	142
	1-2 yrs.	229	1	3	11	244
	3+ yrs.	104	1	-	4	109
	Preventive <1 yr.	51	2	1	2	56
	1-2 yrs.	89	2	1	4	96
	3+ yrs.	5	-	-	1	6
	Nutrition	12	2	6	-	20
	Subtotal	625	8	13	27	673
WOMEN	Illness <50 yrs.	37	2	2	3	44
	50+ yrs.	-	-	-	-	-
	Preventive	38	-	1	-	39
	Antenatal	27	1	1	1	30
	Labor and Delivery	1	-	-	-	1
	Postnatal	5	1	-	1	7
	Subtotal	108	4	4	5	121
FAMILY PLANNING	Preacceptance	16	31	1	4	52
	Contraceptive Services	11	7	1	8	27
	Follow-Up	8	5	-	5	18
	Subtotal	35	43	2	17	97
MEN--Illness		8	6	-	1	15
RAPPORT		75	94	6	4	179
TOTAL		851	155	25	54	1085

*Excludes time of village attendants and social scientist.

Table III.A.32

TIME SPENT PERFORMING DIRECT SERVICE ACTIVITIES BY FHWs OR FPEs
IN ALL EXPERIMENTAL GROUPS, 1974
SERVICE AND RESEARCH COMBINED
(Minutes per Week per 1000 Population)

	DIRECT SERVICES	FHW			FPE
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN	Illness <1 yr.	25	4	116	-
	1-2 yrs.	21	-	73	1
	3+ yrs.	46	3	65	1
	Preventive <1 yr.	16	3	42	1
	1-2 yrs.	12	-	22	-
	3+ yrs.	1	-	2	-
	Nutrition	13	-	1	-
	Subtotal	134	10	321	3
WOMEN	Illness <50 yrs.	127	114	33	17
	50+ yrs.	46	29	3	2
	Preventive	11	34	15	6
	Antenatal	24	82	15	6
	Labor and Delivery	2	5	-	2
	Postnatal	17	9	3	1
	Subtotal	227	273	69	34
FAMILY PLANNING	Preacceptance	15	27	32	207
	Contraceptive Services	1	13	7	2
	Follow-Up	21	43	18	40
	Subtotal	37	83	57	249
MEN--Illness		11	4	4	1
RAPPORT		32	45	39	112
TOTAL		441	415	490	399

Table III.A.33

DIRECT SERVICE CONTACTS BY SELECTED STAFF IN ALL EXPERIMENTAL GROUPS, 1971
(Contacts per Week per 1000 Population)

TYPE OF CONTACT	EXPERIMENTAL GROUP AND TYPE OF STAFF								
	FP+WS+CC			FP+WS			FP+CC		
	FHW	DR	FPW	FHW	DR	FPW	FHW	DR	FPW
CHILDREN									
<1 yr.	22.9	1.7	0.5	3.5	0.3	0.2	34.9	2.6	3.7
1-2 yrs.	33.5	2.3	3.3	0.6	0.2	0.2	58.6	5.6	6.6
3+ yrs.	32.1	1.8	0.6	0.6	0.2	0.1	33.8	3.2	5.3
Subtotal	88.5	5.8	4.4	4.7	0.7	0.5	127.3	11.4	15.6
WOMEN	100.0	6.5	1.1	82.2	10.6	0.9	52.0	3.6	0.2
MEN	3.0	0.6	2.5	1.4	0.8	4.4	2.3	1.3	5.8
NON-SPECIFIC	27.8	4.3	4.5	17.4	3.6	4.8	25.3	5.6	7.0
RAPPORT	55.0	1.4	20.1	55.0	5.1	35.2	58.4	3.6	52.1
TOTAL	274.3	18.6	32.6	160.7	20.8	45.8	265.3	25.5	80.7
HOMES VISITED	45	1	8	34	2	6	65	2	17

Table III.A.34

DIRECT SERVICE CONTACTS BY FHWs AND FPEs IN ALL EXPERIMENTAL GROUPS, 1974
(Contacts per Week per 1000 Population)

DIRECT SERVICE CONTACTS		EXPERIMENTAL GROUP & TYPE OF STAFF			
		FHW			FPE
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN	Illness <1 yr.	9.3	0.6	30.4	-
	1-2 yrs.	10.0	-	22.9	-
	3+ yrs.	23.1	0.9	18.8	0.5
	Preventive <1 yr.	8.6	1.2	28.0	-
	1-2 yrs.	10.0	-	11.5	-
	3+ yrs.	0.2	-	1.2	-
	Nutrition	3.0	-	3.9	-
	Subtotal	64.2	2.7	116.8	0.5
WOMEN	Illness <50 yrs.	49.3	49.8	21.4	6.8
	50+ yrs.	19.2	16.7	3.6	1.3
	Preventive	17.6	27.9	20.0	8.6
	Antenatal	6.2	11.4	3.0	3.9
	Labor and Delivery	0.2	-	-	-
	Postnatal	4.2	2.1	2.1	1.8
	Subtotal	96.7	107.9	50.1	22.4
FAMILY PLANNING	Preacceptance	5.8	12.0	12.8	25.4
	Contraceptive Services	1.6	4.1	1.2	0.5
	Follow-Up	6.0	16.4	8.9	10.5
	Subtotal	13.4	32.5	22.7	36.4
MEN--Illness		2.8	0.6	1.2	-
RAPPORT		47.0	47.2	53.3	50.3
TOTAL		224.1	190.9	244.3	109.6
HOME VISITS ATTEMPTED		30	47	48	50
HOME VISITS COMPLETED		27	41	41	34

Table III.A.35

TIME SPENT AND CONTACTS MADE FOR DIRECT SERVICE OUTSIDE OF WORKING-HOURS BY SELECTED STAFF IN EACH EXPERIMENTAL GROUP, 1971 AND 1974

EXPERIMENTAL GROUP	TYPE OF STAFF AND YEAR				
	FHW OR FPE		FPW		DR
	1971	1974	1971	1974	1971
FP+WS+CC					
Time	84	228	2	6	19
Contacts	8.4	5.2	0.2	0.7	0.4
FP+WS					
Time	36	30	8	4	6
Contacts	2.7	3.3	1.2	0.4	0.2
FP+CC					
Time	65	171	4	20	14
Contacts	3.5	9.6	0.6	0.9	0.2
FP-Ed.					
Time	-	8	-	6	-
Contacts	-	0.4	-	1.0	-

B. SERVICE RECORDS ANALYSIS

All records maintained by the service staff were potential sources of useful information for analysis as well as for their practical use in the delivery of services. Since the information system was constructed to meet service needs, these records had some limitations for research purposes. Consistency in details, in definitions, in completeness and legibility were certainly not on the level of a research instrument. Beginning in 1970 a review of the service records to determine whether they were adequate for research purposes was carried out culminating in an outline and code manual for abstracting the most relevant data from these records. Actual collection of the data started in 1972, and eventually covered all years of the project.

Pertinent data from the service records that could be utilized included:

(1) Process Data - The various components of services such as type of service, content of service, problem involved, treatment given, the sequence of care, etc.

(2) Output Data - A summary count of all types of services provided by each type of health worker and received by each member or group in the study population.

In addition to the quantitative nature of these data the process information provided information that could be compared against the procedures and standing orders set up as guidelines for the family health workers. The quality of the worker's performance was thus also measured.

Initially a standard detailed format for abstracting service records information was developed and applied to all the 1971 data to provide a basis for matching with the 1971 work sampling data. The intention was to complete all the other years of the project in a similar fashion. However, when uncertainty developed about the project's continuation, a shift was made to a much simpler and more rapid collection format which limited the amount of information abstracted but assured complete coverage of all years. These are described below.

1. Methods

Detailed coding manuals were developed, pretested and refined to translate information on the service records into quantitative measures.

Specially trained coders then took those manuals and coded the service records right in the field so that the records were always available to the health worker. Records that were completed and no longer used in the field were on file in Narangwal and were coded in the office. The coded data were then punched and transferred to magnetic tapes for analysis.

The two different versions of coding included the following:

a. Full length service records analysis

Originally the coding format designed for the service records attempted to capture almost all the quantitative information mentioned above. A summary of pertinent general information was created for each woman, child and man covered by any of the service records. Each service contact was then coded in detail. This type of coding was carried out for all services provided by FHWs and physicians during 1971 in the FP+WS+CC, FP+WS and FP+CC villages. In addition, it was also used for abstracting the service records of the FPW in the FP+WS+CC villages for all years of the project up to mid-1973.

b. Rapid service records analysis and quick tally

The most important component of service records data was a count of services described previously under "output data." To collect as much as possible before the end of the project several simplified formats were used to code this information. They involved the incorporation of all contacts received by an individual in one year into one summary count by place, type of contact, and health worker involved. The intention was to rapidly code all years other than 1971 and then if time permitted to go back and code all or samples of these years using the full length service records analysis. As it turned out, there was just sufficient time to do the rapid analysis and quick tallies in all study villages for the years, 1969, 1970, 1972, 1973 and up to April 1974 in the FP-Education villages.

c. Other sources

A number of other project studies collected information that was used to supplement the service records data. These included counts of the numbers of visits made to homes, or services rendered in the clinic, that were recorded as part of anthropometric, morbidity and fertility surveys. In addition, immunization records and feeding center attendance records were utilized.

d. Quality control

Maintenance of the quality of service records was a part of the ongoing activities of service supervisors. Although the FANS team could make suggestions for modification of the forms or their recording, the major monitoring and modifications of recording techniques were done primarily with service objectives in mind. Quality control of the abstracting and coding was carried out by means of careful training of the coders and a routine 10 percent or greater recode check. If errors were identified in certain items or if they were made more frequently by a special coder, up to 100 percent recoding was carried out until the problem was corrected.

One problem with the service records analysis was making sure that all the service records were coded. Every attempt was made to code all records in use. However, with turnover in the service population, records were sometimes discarded. These discarded records were supposed to be filed in the headquarters office, but there was no way to be sure that all records were available. There was evidence that some discarded records were actually lost. The effect of lost records would appear to be relatively minor due to the fact that the proportion of discontinued cases was small and the chances of losing service records was minimized by organizing a more systematic method for collecting discards shortly after the problem was identified.

2. Findings and Analysis

For this report the analysis of service records has focused almost completely on the volume of different types of visits or service-contacts provided by the workers most directly responsible for field activities. These were the FHW, FPE, FPW and the physician. When the care was provided by a supervisor (FHS, FPS or PHN) in place of the field workers, those rare occasions were included with the field workers total. (For the sake of consistency all services, visits, and contacts involving the delivery of health care or family planning are termed service-contacts in this section.) The data are given in terms of annual contacts per 1000 population.

a. Children's services

Records of child care were maintained only in the FP+CC and FP+WS+CC experimental groups. In tables III.B.1 and III.B.2 the service-contacts provided by all staff for children over three years of age

and under three years of age during all the years of the project are summarized. (Data for the second half of 1973 were unavailable for this analysis. It was delayed in being transmitted from India and will be used in subsequent analyses. For the FP+WS+CC experimental group the data for the first six months were doubled to produce a full year's estimate. This was not possible for the FP+CC experimental group which underwent substantial changes in its service pattern in mid-1973.) In both experimental groups the volume of service contacts peaked in 1970 and then declined. The most dramatic drop occurred between 1971 and 1972. In the FP+CC group this drop was almost entirely related to recorded illness contacts and can be explained possibly by a change in recording policy. Maintenance of a separate child service record (card) for individual entries for each contact with ill children under 3 years of age was discontinued in 1972. All contacts were then recorded on the morbidity research forms where identification of each individual contact during an illness was more difficult. The drop in recorded contacts involved multiple types of services in the FP+WS+CC experimental group and parallels the decline noted in work sampling. In 1972 the frequency of home visiting for children services was reduced in this group and may explain the decline in service contacts. These explanations do not rule out an actual decline in the volume of services in the FP+CC group or other causes for the decline in the FP+WS+CC group. However, in the absence of other explanations it would appear these were the major factors involved.

Comparisons between the two experimental groups emphasize the difference in intensity of services to children under three. The greatest difference between groups was in morbidity survey contacts and illness contacts. These two were closely linked since the more frequent morbidity survey contacts identified more illnesses requiring treatment. In comparison service contacts with children over three was higher in the FP+WS+CC group. Feeding center attendances started off quite high in the FP+CC experimental group and then gradually declined over time, whereas the attendances were lower but more stable in the FP+WS+CC group until a substantial drop occurred in the final year.

It is difficult to compare the 1974 work sampling contact counts with the service records data since the latter did not continue into 1974.

However, in 1971 the two sources of data gave almost identical counts of service contacts for children under three in both experimental groups. The counts for children over three were much higher in the work sampling observations, probably indicating a large volume of illness care being given on an information basis to these children which never got recorded in any service record.

Physician contacts were combined with the FHW's contacts in these tables since differentiation of the two types of contacts was incomplete in the children's service record analysis. By using the work sampling data in Table III.A.33 it is possible to estimate that physicians provided 7 percent as many child service contacts as FHWs in FP+WS+CC and 9 percent as many in FP+CC. This would mean that physicians saw about 60 and 210 children under three years of age per 1000 population per year in FP+WS+CC and FP+CC respectively, indicating four times as much physician input for child care in the FP+CC group of villages as compared with FP+WS+CC.

b. Women's Services

Women's service records were maintained in all health service experimental groups since prenatal care was given as part of child care. Table III.B.3 summarizes the major categories of service-contacts recorded. Contacts provided by FHWs and physicians were totalled on an annual basis for all years of the project through 1973 and standardized to a total population of 1000.

In all experimental groups the level of service-contacts remained fairly constant from 1970 onwards, with the FP+WS group providing more contacts per 1000 than the FP+WS+CC group. Except for the routine fertility survey and antenatal visits, minimal care of women was recorded in the FP+CC group. The fertility survey volume was very close to the other experimental groups and the antenatal visits were about half as frequent. The only area where the FP+WS+CC experimental group consistently exceeded the FP+WS group was in the number of contacts with women over 50 years of age. This difference became minimal in 1973 following an overt attempt to reduce part of this load in the FP+WS+CC experimental group by giving more days of medication per visit and delegating some of the routine handing out of aspirin to village attendants. The maximum coverage of birth events by FHWs occurred in the

FP+WS+CC experimental group in 1972 and 1973 (75-80 percent, assuming one contact per delivery and a birth rate of 30).

The numbers of physician contacts were very similar in the FP+WS and FP+WS+CC experimental groups except for 1970 and 1971 when the physician in the FP+WS group seems to have been particularly active. The physician contacts as a percent of FHW contacts for illnesses very rarely deviated much from 10 percent in either of the two experimental groups providing significant amounts of illness care.

c. Family planning

Records of family planning contacts were available in all experimental groups. These have been divided into preacceptance contacts (motivation, advice, education), contraceptive service contacts (delivery of the actual family planning method) and followup contacts. Tables III.B.4 and III.B.5 show these contacts on an annual basis for each year of the family planning program in each of the particular experimental groups. Since the FP-Education experimental group had such a late start, service statistics were collected in 1974 right up to termination of all services in April.

Family planning service contacts increased in all experimental groups in every year except for 1973 in the FP+CC and FP+WS groups. The most marked increases occurred between 1971 and 1972 coinciding with the introduction of systematic family planning education linked with the service programs. The most consistent improvement over time was made by the FHWs. The FPW in the FP+WS experimental group showed a marked increase in service contacts each year except in 1973, registering his highest input in 1972. The FPW contacts in the FP-Education experimental group never approached the levels in the other groups. Recorded FHW contacts in the FP+WS+CC experimental group and FP+WS experimental group were very similar in 1972 and 1973, being equivalent to the recorded contacts made by the FPE in the FP-Education group. All were at least three times greater than the level of contacts in the FP+CC group. The number of recorded physician contacts varied somewhat but remained relatively constant over all experimental groups and all years.

When the 1973 FHW recorded contacts are compared with the 1974 work sampling observations all show that many family planning contacts were not recorded except possibly in the FP+WS+CC experimental group. The observed contacts were as much as three times greater than the recorded contacts, attesting to the fact that multiple informal opportunities to give family planning advice were probably being used extensively in all experimental groups except the FP+WS+CC group where the FHWs were in general busier than in other groups.

In addition to the absolute numbers of contacts the ratio of family planning contacts to all other contacts is given to provide an impression of the balance of these different services in the various experimental groups. Excluding the FP-Education group where some rapport or "friendly" type contacts were recorded as other services, the FP+WS group had the highest ratio of FP contacts, approaching 30 percent in 1972. Surprisingly the FP+WS+CC experimental group, which had the most variety of services to deliver, had a ratio greater than in the FP+CC group in every year in which comparison was possible. This was true for the total as well as FHW contacts, but the opposite was the case for physician contacts.

When specific types of family planning contacts were examined the greatest variations over time and between experimental groups are seen in the preacceptance contacts. Followup and service contacts remained relatively constant.

Finally, in Table III.B.6 the followup contacts of FHWs and physicians in 1971 are related to the type of contraceptive used by the couple receiving the service contact. Injectable Depo-Provera required or received by far the largest number of followup contacts, ranging from a little less than 50 percent in the FP+WS+CC experimental group to 75 percent in the FP+CC experimental group. Except in the FP+CC group, IUDs received the next most frequent volume of followup contacts.

Table III.B.1

RECORDED SERVICE CONTACTS MADE WITH CHILDREN IN THE HOME OR CLINIC BY TYPE OF CONTACT AND YEAR - TOTAL PER YEAR PER 1000 POPULATION IN THE FP+WS+CC EXPERIMENTAL GROUP

AGE GROUP AND TYPE OF CONTACT	YEAR 1969	1970	1971	1972	1973
<3 Years					
Neonatal	40	105	113	124	110
Illness	538	641	834	540	377
Health Check	539	738	427	421	294
Weight Check	700	836	831	460	338
Diet Check	227	526	475	232	270
Other	270	301	364	194	151
Subtotal	2314	3147	3044	1971	1540
3+ Years					
Illness	500	539	671	423	300
Health Check	4	1	19	4	3
Weight Check	89	24	-	5	10
Diet Check	3	6	4	10	2
Other	34	26	38	10	5
Subtotal	630	596	732	452	320
TOTAL	2944	3743	3776	2423	1860
FEEDING CENTER ATTENDANCE	17,791*	18,423	20,427	19,272	13,615

* 1969 attendance estimated using 1970-1973 attendance trends and food supply data of 1969

E R R A T A

Table III.B.2

RECORDED SERVICE CONTACTS MADE WITH CHILDREN IN THE HOME OR CLINIC BY TYPE OF CONTACT AND YEAR--TOTAL PER YEAR PER 1000 POPULATION IN THE FP+CC EXPERIMENTAL GROUP

AGE GROUP AND TYPE OF CONTACT	YEAR				
	1969	1970	1971	1972	1973 (Jan-May)
<3 Years					
Neonatal	-	2	5	44	19
Illness	1,833	2,492	2,364	1,949	909
Morbidity Survey	1,161	1,121	788	770	286
Weight Check	535	796	794	997	424
Diet Check	79	505	529	614	261
Other	111	127	253	166	79
Subtotal	3,719	5,043	4,733	4,540	1,978
3+ Years					
Illness	321	423	466	310	189
Health Check	-	-	-	-	-
Weight Check	147	178	-	19	18
Diet Check	-	-	4	-	-
Other	2	4	21	2	3
Subtotal	470	605	491	331	211
TOTAL	4,189	5,648	5,224	4,871	2,189
FEEDING CENTER ATTENDANCE	25,134*	23,202*	19,596	17,551	(full yr.) 16,704

*1969 and 1970 attendance estimated using 1971-1973 attendance data and food supply data of 1969 and 1970.

Table III.B.2

RECORDED SERVICE CONTACTS MADE WITH CHILDREN IN THE HOME OR CLINIC BY TYPE OF CONTACT AND YEAR - TOTAL PER YEAR PER 1000 POPULATION IN THE FP+CC EXPERIMENTAL GROUP

AGE GROUP AND TYPE OF CONTACT	YEAR 1969	1970	1971	1972	1973
<3 Years					
Neonatal	-	2	5	44	19
Illness	1833	2492	2364	1415	909
Morbidity Survey	1161	1121	788	609	286
Weight Check	535	796	794	997	424
Diet Check	79	505	529	614	261
Other	111	127	253	166	79
Subtotal	3719	5043	4733	3845	1978
3+ Years					
Illness	321	423	466	310	189
Health Check	-	-	-	-	-
Weight Check	147	178	-	19	18
Diet Check	-	-	4	-	-
Other	2	4	21	2	3
Subtotal	470	605	491	331	211
TOTAL	4189	5648	5224	4176	2189
FEEDING CENTER ATTENDANCE	25,134*	23,202*	19,596	17,551	(full yr.) 16,704

* 1969 and 1970 attendance stimated using 1971-1973 attendance data and food supply data of 1969 and 1970.

Table III.B.3

RECORDED HEALTH CONTACTS MADE WITH WOMEN IN THE HOME OR CLINIC BY TYPE OF CONTACT, YEAR AND STAFF TOTAL PER YEAR PER 1000 POPULATION IN EACH EXPERIMENTAL GROUP

EXPERIMENTAL GROUP & TYPE OF CONTACT	YEAR AND TYPE OF STAFF									
	1969		1970		1971		1972		1973	
	FHW	DR	FHW	DR	FHW	DR	FHW	DR	FHW	DR
FP+WS+CC										
Illness <50 yrs.	412	39	1169	69	1349	96	1189	99	1134	102
50+ yrs.	97	10	255	22	371	33	328	32	280	23
Fertility Survey	442	-	561	-	637	-	621	-	575	-
Antenatal	77	7	206	14	159	21	138	31	163	31
Labor-Delivery	3	1	5	1	18	1	22	1	24	2
Postnatal	39	1	104	1	110	3	132	3	124	2
Other	47	-	124	-	10	1	74	-	78	-
Total	1117	58	2424	107	2654	155	2504	166	2378	160
FP+WS										
Illness <50 yrs.	622	43	1598	136	1582	149	1281	105	1392	103
50+ yrs.	55	5	250	24	272	30	225	13	277	23
Fertility Survey	373	-	686	-	734	-	721	-	583	-
Antenatal	71	8	176	22	224	35	208	28	213	36
Labor-Delivery	2	1	8	1	9	1	21	1	15	2
Postnatal	31	1	102	3	115	6	158	3	125	2
Other	197	-	282	-	10	1	151	-	109	-
Total	1351	58	3102	136	2946	222	2765	150	2814	166
FP+CC										
Illness <50 yrs.	2	1	43	3	19	9	25	7	30	7
50+ yrs.	-	-	-	-	-	-	-	-	-	-
Fertility Survey	77	-	456	-	513	-	493	-	510	-
Antenatal	2	1	84	2	86	2	74	6	101	4
Labor-Delivery	-	-	-	-	-	-	1	-	1	-
Postnatal	-	-	2	-	4	1	43	1	23	-
Other	-	-	-	-	-	-	40	-	43	-
Total	81	2	585	5	622	12	676	14	707	11

Table III.B.4

RECORDED FAMILY PLANNING CONTACTS MADE IN THE HOME OR CLINIC BY TYPE OF CONTACT, YEAR AND STAFF COMPARED WITH ALL OTHER CONTACTS, TOTAL PER YEAR PER 1000 POPULATION FP+WS+CC AND FP+WS EXPERIMENTAL GROUPS

YEAR AND TYPE OF CONTACT		EXPERIMENTAL GROUP AND TYPE OF STAFF							
		FP+WS+CC				FP+WS			
		FHW	FPW	DR	TOTAL	FHW	FPW	DR	TOTAL
1969	Preacceptance	49	3	5	57	71	3	10	84
	Contraceptive Service	8	-	11	19	12	1	11	24
	Follow-Up	102	1	4	107	110	1	13	124
	Total FP	159	4	20	183	193	5	34	232
	All Others	4021	19	98	4138	1351	22	58	1431
	Ratio FP: Others	.040	.211	.204	.044	.143	.227	.586	.162
1970	Preacceptance	54	76	3	133	95	75	15	185
	Contraceptive Service	13	28	11	52	16	2	9	27
	Follow-Up	205	23	5	233	169	22	12	203
	Total FP	272	127	19	418	280	99	36	415
	All Others	6126	120	148	6394	3102	205	186	3493
	Ratio FP: Others	.044	1.058	.128	.065	.090	.483	.194	.119
1971	Preacceptance	87	75	6	168	85	159	6	250
	Contraceptive Service	20	30	8	58	30	2	13	45
	Follow-Up	175	51	5	231	188	108	13	309
	Total FP	282	156	19	457	303	269	32	604
	All Others	6386	113	199	6698	2946	169	222	3337
	Ratio FP: Others	.044	1.381	.095	.068	.103	1.592	.144	.181
1972	Preacceptance	213	63	14	290	370	192	14	576
	Contraceptive Service	11	25	9	45	20	5	12	37
	Follow-Up	180	61	14	255	122	163	10	295
	Total FP	404	149	37	590	512	360	36	908
	All Others	4848	29	245	5122	2765	122	150	3037
	Ratio FP: Others	.083	5.138	.151	.115	.185	2.951	.240	.299
1973	Preacceptance	321	57	11	389	364	77	14	455
	Contraceptive Service	19	3	11	33	16	3	15	34
	Follow-Up	196	26	7	229	117	86	15	218
	Total FP	536	86	29	651	497	166	44	707
	All Others	4183	44	215	4442	2814	47	166	3027
	Ratio FP: Others	.128	1.955	.135	.147	.177	3.532	.265	.234

Table III.B.5

RECORDED FAMILY PLANNING CONTACTS MADE IN THE HOME OR CLINIC
BY TYPE OF CONTACT, YEAR AND STAFF COMPARED WITH ALL OTHER CONTACTS,
TOTAL PER YEAR PER 1000 POPULATION IN FP+CC AND FP-ED. EXPERIMENTAL GROUPS

YEAR AND TYPE OF CONTACT		EXPERIMENTAL GROUP AND TYPE OF STAFF								
		FP+CC				FP-Ed.				
		FHW	FPW	DR	TOTAL	FPE	FPW	FHS	DR	TOTAL
1971	Preacceptance	2	122	4	128	-	-	-	-	-
	Contraceptive Service	8	19	4	31	-	-	-	-	-
	Follow-Up	49	75	27	151	-	-	-	-	-
	Total FP	59	216	35	310	-	-	-	-	-
	All Others	5773	288	85	6146	-	-	-	-	-
	Ratio FP: Others	.010	.750	.412	.050	-	-	-	-	-
1972**	Preacceptance	45	134	9	188	120	17	1	1	139
	Contraceptive Service	11	10	2	23	18	2	4	8	32
	Follow-Up	99	138	13	250	81	7	19	5	112
	Total FP	155	282	24	461	219	26	24	14	283
	All Others	4796	107	70	4973	252	32	3	2	269
	Ratio FP: Others	.032	2.636	.343	.093	.944	.813	8.000	7.000	1.052
1973	Preacceptance	37	72	7	116	304	37	9	3	353
	Contraceptive Service	11	4	3	18	30	6	5	13	54
	Follow-Up	84	59	8	151	197	15	51	12	275
	Total FP	132	136	18	285	531	58	65	28	682
	All Others	3900*	54	85*	4039	351	62	6	2	421
	Ratio FP: Others	.034	2.5	.212	.071	1.513	.935	10.833	14.000	1.620
1974**	Preacceptance	-	-	-	-	176	8	8	1	193
	Contraceptive Service	-	-	-	-	5	1	1	2	9
	Follow-Up	-	-	-	-	86	4	25	3	118
	Total FP	-	-	-	-	267	13	34	6	320
	All Others	-	-	-	-	72	18	3	-	93
	Ratio FP: Others	-	-	-	-	3.708	.722	11.333	0	3.441

*Data for other services was available only for 6 months, therefore the annual total is an estimate.

**In the FP-Ed. experimental group 1972 data is from July through December and 1974 data is January through April.

Table III.B.6

RECORDED FAMILY PLANNING FOLLOW-UP CONTACTS BY TYPE OF METHOD AND STAFF, TOTAL FOR 1971 IN THE FP+WS+CC, FP+WS AND FP+CC EXPERIMENTAL GROUPS

PERCENT OF FOLLOW-UP CONTACTS BY TYPE OF METHOD	EXPERIMENTAL GROUP AND TYPE OF STAFF								
	FP+WS+CC			FP+WS			FP+CC		
	FHW	DR	TOTAL	FHW	DR	TOTAL	FHW	DR	TOTAL
IUCD	20.0	14.7	19.8	11.9	21.5	12.5	0.4	0.8	0.6
STERILIZATION	1.8	3.0	1.9	3.5	13.9	4.2	1.3	-	0.8
CONDOMS	12.4	8.8	12.3	8.8	9.2	8.8	16.5	6.2	12.8
ORAL PILLS	15.4	14.7	15.4	5.6	4.6	5.6	11.4	10.1	10.9
DEPO-PROVERA	47.5	55.9	47.7	70.1	50.8	68.8	70.0	82.9	74.6
OTHER AND NOT SPECIFIED	2.9	2.9	2.9	0.1	-	0.1	0.4	-	0.3
TOTAL %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	1091	34	1125	910	65	975	237	129	366

C. HEALTH SERVICE UTILIZATION SURVEYS

When health services are introduced into a community they never enter a vacuum. People seek medical care from whatever source is available to them, whether through local indigenous practitioners, home treatment or travelling to the nearest government facility. This is certainly the case in Punjab where a large variety of practitioners are available in villages and small towns. In addition government curative services are rarely more than ten miles distant from any village and certain government services, such as malaria and smallpox programs, reach out to every household. In this setting it was considered desirable to measure all the sources of health care in the study villages so that a quantitative estimate could be made of total health inputs, both curative and preventive, which occurred in the villages. It was of special interest to ascertain what happened to the old utilization patterns when new services were made easily accessible in the villages.

In order to collect this type of information a special sample household survey was initiated. The survey was designed to measure the following:

(1) Health status - the general level of overt health problems in the entire population as elicited by using local definitions of symptoms and complaints.

(2) Input - the sources of health care used and expenditures related to that care.

(3) Process - the types of consultation and treatment provided by the various sources.

(4) Output - the number of different services received over a defined period.

In addition reasons for seeking or not seeking health care when a problem was present were ascertained.

1. Methods

a. Sample

Previous experience with utilization surveys in our Functional Analysis Project showed that 100 was the minimum number of households required

for an adequate sample to permit analysis of any segment of the study population. It was therefore decided that 100 households would be interviewed in each experimental group of the project every quarter of the year in order to monitor seasonal variations. This would also provide a minimum of 100 households per village on an annual basis (100 households represented approximately 10 percent of the population). Four interviewing rounds of all the study villages were planned for each year. Within each round the number of households to be interviewed in each village depended on the proportion of that population to the population of the total experimental group. This proportion was multiplied by 100 to determine the number of households for a particular village. On every round the appropriate number of households was randomly selected from all village households using lists of random numbers. Multiple attempts were made to interview respondents who were not available on earlier visits. Only after all attempts failed would a substitute household, also selected randomly, be provided by the supervisor for interview.

b. Timing and procedures

The utilization surveys were not introduced until 1973. The first round was carried out in one block of time covering approximately the first four months of 1973. At that time with the project's future uncertain it was decided to double the size of the sample in this round. Then because of the rush of other urgent activities, the second round did not start until the end of 1973 and lasted into 1974. The project was terminated before any additional rounds occurred.

The same staff that made the work sampling observations did the household interviews. Interviews for the second round were alternated every other fortnight with the second round work sampling. The team of investigators usually was able to interview all selected households in one village in one day, completing the villages of an experimental group in sequence.

Interviews were carried out using the most responsible person available in the household at the time. This was usually the head of the household or his wife. All information elicited was from recall of the two week period prior to the interview. When individual health problems during the two week period were identified the affected person was interviewed about the problem and any care received for it.

c. Quality control

As in the other studies, adequate training and field practice were scheduled to prepare the interviewers for their job. The supervisors accompanied the team into the villages at all times providing support as well as carrying out simultaneous repeatability checks. On a random basis approximately 20 percent of the households were selected for reinterviews. Discrepancies in collected data were less than 5 percent of all items checked. However, additional illness episodes along with associated practitioner use were consistently identified by the more experienced supervisors going back into the households and probing carefully for any missed episodes. The possibility was recognized that these new illness reports may have been because the household was sensitized by the first interviewer and remembered additional episodes when the supervisor visited. Also members of the household who were present only for the re-interview may have recalled episodes not remembered by the first respondent. In any case, and in spite of continued retraining and supervision of interview techniques, the number of additional episodes picked up by re-interviews persisted consistently at 15 to 20 percent more than the episodes identified on the first interview. Since these additional episodes on the 20 percent sample were included in the data analyzed, the actual under-reporting in the results discussed in this section could be about 15 percent in all experimental groups and for both rounds.

2. Findings and Analysis

Although the two week recall period limited the volume of data and subjected it to seasonal effects it was felt more was gained in accuracy of recall than was lost due to these problems. However, since only two rounds of interviews were completed and both rounds were approximately at the same time of year (between December and April), the data cannot be considered completely representative.

a. Home visiting services

In all experimental groups home visits were routinely scheduled events. Even in the control group certain government services were delivered in the home. Tables III.C.1 and III.C.2 present data on

the frequency of specific services in the sampled households during the prior two weeks. Smallpox vaccinations were carried out by government vaccinators as well as Narangwal staff, but in only one experimental group did more than 10 percent of the households report that they had been visited for this activity in both rounds of the survey. Since the vaccinator visits a particular village only at intervals of a few months these results are not surprising. In the case of malaria surveillance, visits occurred at least on a monthly basis. This coverage was excellent with only one experimental group registering slightly less then 50 percent of the households visited in the preceding fortnight in 1973.

In 1973 FP+CC households reported almost twice as many home visits for child care as the FP+WS+CC households. After the discontinuation of the nutrition research activities and especially the weekly morbidity visits in FP+CC, the frequency of home visiting became almost equal in the two child care experimental groups. Women's services maintained essentially the same pattern in both rounds with the FP+WS households reporting twice as many visits as the FP+WS+CC households and three times as many as FP-Education. (FP-Education had a modified fertility survey in the homes.) Since theoretically all the health service villages had the same number of scheduled home visits for women's services, it seemed likely that the FP+WS workers were making many unscheduled visits. Recall of home visits for family planning decreased between rounds in the FP+WS households and increased substantially in the FP-Education experimental group. There was practically no family planning, women's or children's services reported as being received in homes in the control experimental group.

b. Health problems and use of services

Both rounds of the interview survey were combined to produce the tables which follow. No major inter-round differences were noted in the data and by combining results it was possible to differentiate some of the less frequently occurring events. Tables III.C.3 through III.C.7 consolidate the important utilization data for the major groups of the population for which services were provided. The total population of the sample and the

number of ill individuals are given. In all experimental groups the proportion ill during the recall period was very close to one third of the population. The proportion by age group was also remarkably consistent across all experimental groups. For example, the percent of children under three who were ill varied only from 49 to 58. Children over three and men had the lowest number of complaints.

Utilization patterns varied widely but showed a clear response to the presence of specific services in the village, especially when compared with the control experimental group. For example, in villages with children's services, rates of use of health services were 60-70 percent for children under three as compared with 40 percent in the control experimental group. Similar differences were noted for women's services. Men's use of services was fairly consistent across all experimental groups as expected. Assuming that the control experimental group reflects initial levels of use in all villages, women sought care for health problems half as often as men. However, when services were brought to their doorstep the frequency of use of services rose to equivalence with the male level. This is strong evidence of the increased mobility of the men in this environment. It justifies the limiting of village level services to women and children. Men can and do travel outside the village for care much more readily.

Use of Narangwal (RHRC) services did not entirely displace other sources of care. They primarily added to the total level of use. These tables demonstrate the extent of continued use of private practitioners (mostly indigenous practitioners) even when excellent free village level services were present. The FP+CC experimental group showed the greatest shift away from private practitioners for care of children. The FP+WS+CC and FP+WS experimental groups had fairly similar proportions who continued to use private sources for care of women instead of Narangwal services. Very little use of government services was identified, even in the control villages which were deliberately selected to be adjacent to a primary health center. Use of home treatments was lower in those age-sex groups receiving RHRC services in their villages.

Using a specially constructed "need index" developed in the Functional Analysis Project, individuals were classified according to whether or not

their complaints required medical care. Data were recorded in the interview which permitted the use of professional judgement to express the likely need in a standard format. (The index used the type of complaint, duration and associated disability.) The proportion of all ill persons having an identified need, yet not receiving any care, are also shown in these tables (III.C.3 - III.C.7) along with the reasons they gave for not seeking care. This proportion is definitely higher in the control experimental group and also in those age-sex groups in the other experimental groups which were not provided specific services. The proportion needing care was as high as one third in some segments of the population. Women over 50 were consistently recorded as having the greatest unmet need although the FP+WS+CC experimental group was the most successful in reaching this group, as observed also in work sampling.

Unavailability or inaccessibility of services was rarely recognized by the population as a reason why they were unable to get care, even in those villages without Narangwal services. Having never had services, they were unaware that they were underserved. Ineffectiveness of services was more often given as a reason for not seeking care. However, there were several other reasons for not seeking care which were even more common. Most frequent was the feeling that the problem was minor or that they were too busy to bother. Availability of home remedies was also given frequently as a reason.

Minimal variation was noted in the numbers of visits made to health services during the two week period. About two visits seemed to be the average no matter which service was utilized.

c. Reasons for selecting a source of care

When individuals who had sought care for health problems were asked to state why they chose a particular service, varied responses were given. Of greatest concern to this analysis were accessibility and faith or trust in the health worker. In Tables III.C.8 through III.C.12 users of Narangwal services were about equally split, with about a third stating that the service was accessible, a third stating that they trusted the service, and a third giving other reasons, such as being recommended by others or due

to force of habit. Lack of financial charges was rarely mentioned. Trust also predominated as the reason why individuals chose private practitioners or the government services.

d. Location of services utilized

Questions of accessibility and coverage depend largely on location of services. Tables III.C.13 through III.C.17 show that the location of private practitioners' services was the main concern since the Narangwal services were always available in the same village and there were so few individuals using government services. Over 50 percent of all consultations to private practitioners occurred in the village of residence or an adjacent village. This was highest in the FP-Education experimental group and the control group, but differences were not great. Use of practitioners in other villages or towns and cities also followed consistent proportions except for the FP+WS experimental group which had a market town close to the study villages. With the obvious availability of practitioners in villages as indicated in these data, it is apparent why accessibility is rarely mentioned as a problem even in villages without Narangwal services.

Table III.C.1

PERCENTAGE OF HOUSEHOLDS IN THE SAMPLE HOUSEHOLD SURVEY RECEIVING HOME SERVICES IN EACH EXPERIMENTAL GROUP DURING A TWO WEEK PERIOD

1973

	EXPERIMENTAL GROUP				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P
NO. OF HOUSEHOLDS SAMPLED	200	204	199	196	199
% Receiving Home Services Related to:					
SMALLPOX	25.0	3.4	9.5	3.1	1.5
MALARIA	81.5	83.3	81.4	47.4	70.4
CHILD CARE	17.0	0.5	28.1	0.5	-
WOMEN'S CARE	23.5	42.6	27.1	13.3	-
FAMILY PLANNING	8.5	15.2	11.1	18.9	-
OTHER FUNCTIONS	2.5	3.4	5.5	2.0	1.0

Table III.C.2

PERCENTAGE OF HOUSEHOLDS IN THE SAMPLE HOUSEHOLD SURVEY RECEIVING HOME SERVICES IN EACH EXPERIMENTAL GROUP DURING A TWO WEEK PERIOD

1974

	EXPERIMENTAL GROUP				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P
NO. OF HOUSEHOLDS SAMPLED	125	100	103	99	1[illegible]0
% Receiving Home Services Related to:					
SMALLPOX	4.0	10.0	1.9	10.1	5.0
MALARIA	62.4	72.0	64.1	59.6	57.0
CHILD CARE	15.2	2.0	17.5	-	-
WOMEN'S CARE	16.8	31.0	17.5	10.1	-
FAMILY PLANNING	8.0	8.0	12.6	26.3	1.0
OTHER FUNCTIONS	3.2	2.0	2.9	-	-

Table III.C.3

PERCENTAGE OF PERSONS IN THE SAMPLE HOUSEHOLD SURVEY WHO WERE ILL AND DETAILS OF THOSE RECEIVING TREATMENT OR NEEDING TREATMENT DURING A TWO WEEK PERIOD FP+WS+CC EXPERIMENTAL GROUP, 1973-1974

	CHILDREN		WOMEN		MEN	
	<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	TOTAL
Persons in Sample	164	594	492	147	726	2123
Persons Ill (N)	87	202	184	112	163	748
Persons Ill (%)	(53.0)	(34.0)	(37.4)	(76.2)	(22.5)	(35.2)
% Ill-Consulting--TOTAL	70.1	53.0	42.4	43.8	40.5	48.3
RHRC	43.7	39.6	33.2	23.2	1.8	27.8
PHC & HOSP.	1.1	-	0.5	0.9	3.1	1.1
PVT.	25.3	13.4	8.7	19.7	35.6	19.4
% Ill-Continuing Treatment	1.1	-	2.2	0.9	1.8	1.2
% Ill-Home Treatment	10.3	7.9	11.4	11.6	10.4	10.2
% Ill Needing Consultation by Reason Not Obtained--TOTAL	4.6	15.3	14.7	24.1	24.5	17.2
Unavailable	2.3	-	1.1	1.8	1.8	1.2
Ineffective	-	2.5	3.3	6.3	3.7	3.2
Other	2.3	12.8	10.3	16.0	19.0	12.8

Table III.C.4

PERCENTAGE OF PERSONS IN THE SAMPLE HOUSEHOLD SURVEY WHO WERE ILL AND DETAILS OF THOSE RECEIVING TREATMENT OR NEEDING TREATMENT DURING A TWO WEEK PERIOD
FP+WS EXPERIMENTAL GROUP, 1973-1974

	CHILDREN		WOMEN		MEN	
	<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	TOTAL
Persons in Sample	158	587	526	137	706	2114
Persons Ill (N)	74	163	232	89	191	749
Persons Ill (%)	(46.8)	(27.8)	(44.1)	(65.0)	(27.1)	(35.4)
% Ill-Consulting--TOTAL	48.6	31.3	49.5	40.4	32.5	40.1
RHRC	-	3.7	31.0	23.6	2.1	13.8
PHC & HOSP.	5.4	2.5	3.0	-	2.6	2.7
PVT.	43.2	25.1	15.5	16.8	27.8	23.6
% Ill-Continuing Treatment	-	1.2	1.3	3.4	1.6	1.5
% Ill-Home Treatment	16.2	27.6	9.9	10.1	23.6	17.9
% Ill Needing Consultation by Reason Not Obtained--TOTAL	13.5	17.2	24.1	31.4	27.2	23.2
Unavailable	-	-	-	2.2	1.0	0.5
Ineffective	1.3	1.2	4.7	10.1	5.8	4.5
Other	12.2	16.0	19.4	19.1	20.4	18.2

Table III.C.5

PERCENTAGE OF PERSONS IN THE SAMPLE HOUSEHOLD SURVEY WHO WERE ILL AND DETAILS OF THOSE RECEIVING TREATMENT OR NEEDING TREATMENT DURING A TWO WEEK PERIOD FP+CC EXPERIMENTAL GROUP, 1973-1974

	CHILDREN		WOMEN		MEN	
	<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	TOTAL
Persons in Sample	154	658	453	150	662	2077
Persons Ill (N)	89	161	190	104	178	722
Persons Ill (%)	(57.8)	(24.5)	(41.9)	(69.3)	(26.9)	(34.8)
% Ill-Consulting—TOTAL	62.9	40.4	45.3	28.8	43.2	43.5
RHRC	51.7	24.9	16.3	1.9	1.1	16.8
PHC & HOSP.	4.5	-	1.6	-	1.1	1.2
PVT.	6.7	15.5	27.4	26.9	41.0	25.5
% Ill-Continuing Treatment	7.9	2.5	1.1	2.9	2.8	2.9
% Ill-Home Treatment	6.7	15.5	22.1	14.4	19.7	17.0
% Ill Needing Consultation by Reason Not Obtained—TOTAL	11.2	8.7	14.2	33.7	20.8	17.0
Unavailable	3.4	0.6	-	1.0	0.6	0.8
Ineffective	1.1	1.9	1.1	12.5	6.2	4.2
Other	6.7	6.2	13.1	20.2	14.0	12.0

Table III.C.6

PERCENTAGE OF PERSONS IN THE SAMPLE HOUSEHOLD SURVEY WHO WERE ILL AND DETAILS OF THOSE RECEIVING TREATMENT OR NEEDING TREATMENT DURING A TWO WEEK PERIOD FP-ED. EXPERIMENTAL GROUP, 1973-1974

	CHILDREN		WOMEN		MEN	
	<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	TOTAL
Persons in Sample	156	555	466	121	642	1940
Persons Ill (N)	89	175	223	80	200	767
Persons Ill (%)	(57.1)	(31.5)	(47.9)	(66.1)	(31.2)	(39.5)
% Ill-Consulting--TOTAL	51.7	29.1	36.3	32.5	36.0	36.0
RHRC	-	-	0.4	-	-	0.2
PHC & HOSP.	4.5	1.7	3.6	2.5	3.5	3.1
PVT.	47.2	27.4	32.3	30.0	32.5	32.7
% Ill-Continuing Treatment	1.1	2.9	2.7	6.3	3.0	3.0
% Ill-Home Treatment	12.4	24.6	19.3	12.5	22.5	19.8
% Ill Needing Consultation by Reason Not Obtained--TOTAL	18.0	28.0	19.7	31.3	24.5	23.9
Unavailable	1.1	1.2	-	1.3	-	0.5
Ineffective	2.3	3.4	3.1	10.0	3.0	3.8
Other	14.6	23.4	16.6	20.0	21.5	19.6

Table III.C.7

PERCENTAGE OF PERSONS IN THE SAMPLE HOUSEHOLD SURVEY WHO WERE ILL AND DETAILS OF THOSE RECEIVING TREATMENT OR NEEDING TREATMENT DURING A TWO WEEK PERIOD CONT-P EXPERIMENTAL GROUP, 1973-1974

	CHILDREN		WOMEN		MEN	
	<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	TOTAL
Persons in Sample	164	637	465	152	670	2088
Persons Ill (N)	95	142	188	86	165	676
Persons Ill (%)	(57.9)	(22.3)	(40.4)	(56.6)	(24.6)	(32.4)
% Ill-Consulting--TOTAL	40.0	25.3	28.7	18.6	48.5	33.1
RHRC	-	-	-	-	-	-
PHC & HOSP.	5.3	4.9	8.0	3.5	9.7	6.8
PVT.	34.7	20.4	20.7	15.1	38.8	26.3
% Ill-Continuing Treatment	3.2	2.1	3.7	4.7	4.2	3.6
% Ill-Home Treatment	16.8	15.5	15.4	18.6	15.8	16.1
% Ill Needing Consultation by Reason Not Obtained--TOTAL	23.2	33.1	32.5	43.0	26.7	31.2
Unavailable	1.1	1.4	1.6	4.7	1.2	1.8
Ineffective	1.1	1.4	5.9	8.1	1.8	3.5
Other	21.0	30.3	25.0	30.2	23.7	25.9

Table III.C.8

REASON FOR CHOOSING THE SERVICE USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+WS+CC EXPERIMENTAL GROUP, 1973-1974

TYPE OF SERVICE AND REASON FOR CHOOSING		CHILDREN		WOMEN		MEN	TOTAL
		<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	
RHRC-TOTAL	(N)	38	80	61	26	3	208
Accessible	(%)	36.9	31.3	34.4	53.9	-	35.6
Trusted	(%)	34.2	30.0	36.1	26.9	66.7	32.7
Other	(%)	28.9	38.7	29.5	19.2	33.3	31.7
PHC & HOSP.-TOTAL	(N)	1	-	1	1	5	8
Accessible	(%)	-	-	100.0	100.0	-	25.0
Trusted	(%)	100.0	-	-	-	40.0	37.5
Other	(%)	-	-	-	-	60.0	37.5
PVT.-TOTAL	(N)	22	27	16	22	58	145
Accessible	(%)	9.1	14.8	12.5	13.6	15.5	13.8
Trusted	(%)	63.6	48.2	43.8	27.3	36.2	42.1
Other	(%)	27.3	37.0	43.7	59.1	48.3	44.1

Table III.C.9

REASON FOR CHOOSING THE SERVICE USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+WS EXPERIMENTAL GROUP, 1973-1974

TYPE OF SERVICE AND REASON FOR CHOOSING		CHILDREN		WOMEN		MEN	TOTAL
		<3 yrs.	3-14 yrs.	15-49 yrs.	50+ yrs.	15+ yrs.	
RHRC-TOTAL	(N)	-	6	72	21	4	103
Accessible	(%)	-	16.7	27.8	28.6	50.0	28.1
Trusted	(%)	-	50.0	23.6	23.8	-	24.3
Other	(%)	-	33.3	48.6	47.6	50.0	47.6
PHC & HOSP.-TOTAL	(N)	4	4	7	-	5	20
Accessible	(%)	25.0	-	-	-	20.0	10.0
Trusted	(%)	-	50.0	57.1	-	40.0	40.0
Other	(%)	75.0	50.0	42.9	-	40.0	50.0
PVT.-TOTAL	(N)	32	41	36	15	53	177
Accessible	(%)	21.9	19.5	13.9	26.7	15.1	18.1
Trusted	(%)	34.4	41.5	41.7	26.7	26.4	34.5
Other	(%)	43.7	39.0	44.4	46.6	58.5	47.4

Table III.C.10

REASON FOR CHOOSING THE SERVICE USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+CC EXPERIMENTAL GROUP, 1973-1974

TYPE OF SERVICE AND REASON FOR CHOOSING		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
RHRC-TOTAL	(N)	46	40	31	2	2	121
Accessible	(%)	34.8	37.5	25.8	50.0	50.0	33.9
Trusted	(%)	21.7	35.0	35.5	50.0	50.0	29.7
Other	(%)	43.5	27.5	38.7	-	-	36.4
PHC & HOSP.-TOTAL	(N)	4	-	3	-	2	9
Accessible	(%)	-	-	33.3	-	-	11.1
Trusted	(%)	-	-	-	-	-	-
Other	(%)	100.0	-	66.7	-	100.0	88.9
PVT.-TOTAL	(N)	6	25	52	28	73	184
Accessible	(%)	-	16.0	21.2	25.0	23.3	21.2
Trusted	(%)	66.7	44.0	32.7	46.4	39.7	40.2
Other	(%)	33.3	40.0	46.1	28.6	37.0	38.6

Table III.C.11

REASON FOR CHOOSING THE SERVICE USED BY ILL PERSONS IDENTIFIED IN THE SAMPLE HOUSEHOLD SURVEY
FP-ED. EXPERIMENTAL GROUP, 1973-1974

TYPE OF SERVICE AND REASON FOR CHOOSING		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
RHRC-TOTAL	(N)	-	-	1	-	-	1
Accessible	(%)	-	-	100.0	-	-	100.0
Trusted	(%)	-	-	-	-	-	-
Other	(%)	-	-	-	-	-	-
PHC & HOSP.-TOTAL	(N)	4	3	8	2	7	24
Accessible	(%)	25.0	33.3	12.5	50.0	57.1	33.3
Trusted	(%)	25.0	-	50.0	-	42.9	33.3
Other	(%)	50.0	66.7	37.5	50.0	-	33.3
PVT.-TOTAL	(N)	42	48	72	24	65	251
Accessible	(%)	28.6	29.2	33.3	20.8	27.7	29.1
Trusted	(%)	52.4	60.4	57.0	62.5	53.8	56.6
Other	(%)	19.0	10.4	9.7	16.7	18.5	14.3

Table III.C.12

REASON FOR CHOOSING THE SERVICE USED BY ILL PERSONS IDENTIFIED IN THE SAMPLE HOUSEHOLD SURVEY CONT-P EXPERIMENTAL GROUP, 1973-1974

TYPE OF SERVICE AND REASON FOR CHOOSING		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
RHRC-TOTAL	(N)	-	-	-	-	-	-
Accessible	(%)	-	-	-	-	-	-
Trusted	(%)	-	-	-	-	-	-
Other	(%)	-	-	-	-	-	-
PHC & HOSP.-TOTAL	(N)	5	7	15	3	16	46
Accessible	(%)	-	28.6	26.7	-	31.3	23.9
Trusted	(%)	60.0	14.3	46.7	66.7	37.5	41.3
Other	(%)	40.0	57.1	26.6	33.3	31.2	34.8
PVT.-TOTAL	(N)	33	29	39	13	64	178
Accessible	(%)	21.2	31.0	28.2	23.1	31.2	28.1
Trusted	(%)	48.5	48.3	35.9	38.5	46.9	44.4
Other	(%)	30.3	20.7	35.9	38.4	21.9	27.5

Table III.C.13

LOCATION OF NON-RHRC SERVICES USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+WS+CC EXPERIMENTAL GROUP, 1973-1974

TYPE AND LOCATION OF THE SERVICE		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
PHC & HOSP.-TOTAL	(N)	1	-	1	1	5	8
Same or Adjacent Village	(%)	100.0	-	100.0	100.0	20.0	50.0
Other Villages	(%)	-	-	-	-	-	-
Town or City	(%)	-	-	-	-	80.0	50.0
PVT.-TOTAL	(N)	22	27	16	22	58	145
Same or Adjacent Village	(%)	54.5	55.6	62.5	50.0	54.7	55.0
Other Villages	(%)	18.2	14.8	-	27.3	11.3	14.3
Town or City	(%)	27.3	29.6	37.5	22.7	34.0	30.7

Table III.C.14

LOCATION OF NON-RHRC SERVICES USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+WS EXPERIMENTAL GROUP, 1973-1974

TYPE AND LOCATION OF THE SERVICE		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
PHC & HOSP.-TOTAL	(N)	4	4	7	-	5	20
Same or Adjacent Village	(%)	25.0	-	42.9	-	20.0	25.0
Other Villages	(%)	-	-	-	-	-	-
Town or City	(%)	75.0	100.0	57.1	-	80.0	75.0
PVT.-TOTAL	(N)	32	41	36	15	53	177
Same or Adjacent Village	(%)	43.7	41.5	55.5	46.7	62.3	51.4
Other Villages	(%)	9.4	4.9	2.8	20.0	-	5.1
Town or City	(%)	46.9	53.6	41.7	33.3	37.7	43.5

Table III.C.15

LOCATION OF NON-RHRC SERVICES USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP+ CC EXPERIMENTAL GROUP, 1973-1974

TYPE AND LOCATION OF THE SERVICE		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
PHC & HOSP.-TOTAL	(N)	4	-	3	-	2	9
Same or Adjacent Village	(%)	-	-	33.3	-	50.0	22.2
Other Villages	(%)	25.0	-	-	-	-	11.1
Town or City	(%)	75.0	-	66.7	-	50.0	66.7
PVT.-TOTAL	(N)	6	25	52	28	73	184
Same or Adjacent Village	(%)	83.3	60.0	53.8	53.6	56.2	56.5
Other Villages	(%)	16.7	12.0	17.3	21.4	10.9	14.7
Town or City	(%)	-	28.0	28.9	25.0	32.9	28.8

Table III.C.16

LOCATION OF NON-RERC SERVICES USED BY ILL PERSONS IDENTIFIED
IN THE SAMPLE HOUSEHOLD SURVEY
FP-ED. EXPERIMENTAL GROUP, 1973-1974

TYPE AND LOCATION OF THE SERVICE		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
PHC & HOSP. TOTAL	(N)	4	3	8	2	7	24
Same or Adjacent Village	(%)	-	33.3	-	50.0	14.3	12.5
Other Villages	(%)	75.0	33.3	37.5	-	14.3	33.3
Town or City	(%)	25.0	33.4	62.5	50.0	71.4	54.2
PVT.-TOTAL	(N)	42	48	72	24	65	251
Same or Adjacent Village	(%)	69.1	64.6	56.9	54.2	64.6	62.1
Other Villages	(%)	9.5	4.2	12.5	12.5	10.8	10.0
Town or City	(%)	21.4	31.2	30.6	33.3	24.6	27.9

Table III.C.17

LOCATION OF NON-RHRC SERVICES USED BY ILL PERSONS IDENTIFIED IN THE SAMPLE HOUSEHOLD SURVEY
CONT-P EXPERIMENTAL GROUP, 1973-1974

TYPE AND LOCATION OF THE SERVICE		CHILDREN <3 yrs.	CHILDREN 3-14 yrs.	WOMEN 15-49 yrs.	WOMEN 50+ yrs.	MEN 15+ yrs.	TOTAL
PHC & HOSP.-TOTAL	(N)	5	7	15	3	16	46
Same or Adjacent Village	(%)	80.0	71.4	33.3	33.3	31.3	43.5
Other Villages	(%)	20.0	14.3	40.0	-	43.7	32.6
Town or City	(%)	-	14.3	26.7	66.7	25.0	23.9
PVT.-TOTAL	(N)	33	29	39	13	64	178
Same or Adjacent Village	(%)	60.6	69.0	59.0	53.8	60.9	61.3
Other Villages	(%)	21.2	10.3	15.4	23.1	14.1	15.7
Town or City	(%)	18.2	20.7	25.6	23.1	25.0	23.0

D. COST ANALYSIS

Careful cost accounting of health and family planning activities and services was considered one of the most important analyses in the final assessment of project findings. The possibility of putting "price tags" on program components seemed especially important in providing a basis for developing models for replication in other settings. Since costs are one of the major input variables which need to be measured in any health service research, detailed techniques for collecting expenditure data and allocating costs to various service components had been developed in the original Functional Analysis Project. These were readily adapted to the Narangwal projects due to the availability of good financial as well as materials and supplies records. Of even greater importance was accurate information from the work sampling study concerning distribution of staff time which is the largest cost component of highly labor-intensive primary care services.

1. Method

a. Sources of data

Financial accounts, inventories, supply registers, transportation records and other sources were used to supply all expenditures related to the following cost "heads":

1) Building and maintenance
2) Equipment
3) Supplies
4) Transportation
5) Food supplements
6) Records
7) Drugs
8) Referral to other institutions
9) Laboratory
10) Administration
11) Salaries

As much as possible, we tried to include only service costs in estimating expenditures. Expenditures for research activities were excluded. All donated supplies such as food were priced at current market prices and included. The estimated cost of donated clinic buildings and land were also included. All of these costs were directly allocated to the appropriate

village or experimental group. They are considered quite complete and as accurate a reflection of true project costs as possible.

Allocation of costs

All capital costs were amortized using an annual depreciation of 2 percent for buildings and 5 and 10 percent for different types of equipment.* The annual costs for each "head" were allocated to specific functions and activities utilizing various sources of information, but especially the time distribution of staff from work sampling.

In similar fashion costs were also divided between direct service costs, supportive activity costs and non-productive time costs. Research costs were excluded from salaries according to the proportion of research time measured for each category of staff.

c. Timing and procedure

Data for all years of the project from 1969 through 1973 were collected. Special staff were utilized to abstract the information from appropriate records and compile it in tabular form.

d. Comparable government costs

In a small rural research setting costs are inevitably going to be higher than those of a standard government health service, even when clearly defined research costs are excluded. This is due to a number of reasons, the most important ones being lack of economies of scale in purchases, top heavy transportation and administrative services, and higher cost of fringe benefits which were needed because of the absence of city conveniences. Such measures were important in attracting well qualified individuals to the project.

To make the cost analysis more realistic in reflecting a purely service setting, a series of estimates were made adjusting the Narangwal cost information to the expenditure level of a hypothetical government situation. These estimates are presented in addition to actual costs. In order to calculate these comparable government costs we were able to use data from government primary health centers which had been collected in the previous Functional Analysis Project. Comparison of the estimated government costs

*Derived from depreciation rates used in India for buildings and estimated life expectancy of equipment.

with actual costs showed overall savings of about 50 percent accruing from economies of scale in supplies and drug purchasing, consolidation of transport of staff, reduced administrative costs, use of government fringe benefit guidelines, donation of buildings by the villages and partial donation of food by the villages for their feeding centers. The latter two were procedures that our work had demonstrated to be entirely feasible. Calculations based on these assumptions produced estimates of the cost of providing the full Narangwal services at the level of expenditures that would be required in a typical government setting in Punjab. The purpose of estimating these costs for replicable service packages is that these latter cost estimates would appear to be the most appropriate figures to use in projecting the lower limits of costs which would be possible in widespread government application. It is recognized that there would almost certainly be a decline in quality and impact of services in large scale applications that would also need to be estimated in order to predict the eventual cost-effectiveness of these service packages in the new setting.

2. Findings and Analysis

The data on all services expenditures in each experimental group were consolidated for each calendar year of the project and then calculated as annual expenditures per 1,000 population. In the following discussion and Section V these total costs are presented first and then related to output and outcome measures.

a. Annual RHRC service costs

The actual RHRC expenditures which were related to delivery of services in the experimental villages are presented in Tables III.D.1 through III.D.5. Each table represents one calendar year from 1969-1973. The expenditures are presented as costs for the major functions and services in the experimental groups. In addition, direct service costs, costs of supportive activities and non-productive time costs are summarized at the bottom of the tables.

In general, total expenditures peaked in 1971 and then declined. This decline in the later part of the project reflects the attempt to reduce time spent on less effective components of the service packages in order to

achieve a more replicable pattern. In the FP+CC experimental group the big increase between 1970 and 1971 was related to the introduction of family planning services and the greater than average decline between 1972 and 1973 was due to the reduction in services associated with the termination of the special nutrition project activities in these villages. Although activities were initiated in the FP-Education experimental group in mid-1972, expenditures for that year are shown as total annual costs in order to facilitate comparisons with other groups and between years. This experimental group also showed a decline in service costs between 1972 and 1973.

Multiple factors were operating to produce these overall trends. Certainly variations in service patterns and volume of services as shown in the discussion of activity time and services had a significant effect. Other factors that had major effects include changes in staffing patterns, such as shifts in total numbers as well as types of staff; changes in salary and fringe benefit levels, with increases each year until mid-1972 when some reductions in salaries and fringe benefits had to be made to come in line with the Indian Council of Medical Research guidelines (previously we had been following the somewhat higher level of salaries and benefits provided by the Punjab government to their staff); increases in all other costs that reflected the general inflationary trend in India; and a dramatic increase in vehicle running costs in 1973 related to the big jump in gasoline prices. All of these factors were interacting simultaneously, but it would appear that internal project changes definitely outweighed the external effects of price increases.

The most important and interesting comparisons in these tables, however, are the variations in specific function and service costs between experimental groups.

1) Children's services

Excluding the minimal amounts of services in the other experimental groups, the experimental groups of concern are FP+WS+CC and FP+CC. In spite of the annual trends FP+CC maintained between 5,000-6,000 rupees higher annual expenditures on children's services per 1,000 total population than FP+WS+CC. The difference was predominantly related to higher expenditures in the FP+CC experimental group for care of illnesses

in children under three years of age and higher costs of nutritional supplementation. These service activities were influenced by the more intensive surveillance of children related to the weekly morbidity survey. Other children's services costs were relatively similar in the two experimental groups.

2) Women's services

Cost comparisons of total women's services are meaningful only between the FP+WS+CC and FP+WS experimental groups. Through 1972 expenditures in the latter experimental group ranged 3,000-5,000 rupees higher than in FP+WS+CC. However, in 1973 costs of women's services in the FP+WS group were reduced almost to the level in the FP+WS+CC group. This latter change was entirely due to a substantial drop in expenditures on care of ill women, probably associated with greater emphasis on family planning. All other costs maintained their previous differences. The most important difference, other than expenditures on illness care, was the difference in maternity costs. FP+WS consistently had costs almost double that of FP+WS+CC for maternity care. The largest contributing factor to these differences in women's services was the variation in salary costs related to time spent on these functions. For the few services that were comparable in the FP+CC experimental group the costs of the preventive services (mainly the fertility survey) were very similar to those in the FP+WS+CC experimental group. Maternity care costs were only half as much as those in FP+WS+CC, reflecting the limited type of service.

3) Family planning

Very marked variations in family planning costs were noted between experimental groups. Again the major factor causing these variations was the amount of time spent by staff in family planning activities. Through 1972 the differences in costs between the FP+WS+CC, FP+WS and FP+CC experimental groups were maintained with the latter experiencing the highest expenditures, and FP+WS+CC the least. The high costs in FP+CC were due to the difficulty we had in providing female physician coverage of the services. The result was that there was really a separate physician providing the family planning backup, obviously not the most efficient solution. On an

average the difference between experimental groups was about 2,000 rupees per 1,000 population per year. In 1973 these differences smoothed out considerably with FP+WS and FP+CC being almost identical. Costs in the family planning education experimental group were much higher as would be expected since all efforts were concentrated on family planning. As in other experimental groups it decreased slightly between 1972 and 1973. Overall costs in this experimental group were almost exactly one half of the total costs in the FP+WS+CC group.

4) Men's services

These services were related to emergency care or followup of tuberculosis cases (to reduce chances of infection in the community) and were relatively small and constant in all experimental groups.

5) Direct services

Interesting patterns of expenditures for direct services as compared to supportive activities emerge in these tables. The latter shows the least variation between experimental groups, thus illustrating the fact that the so-called overhead costs were relatively constant no matter what type of service was provided in the villages. As services were added the direct service cost components showed the major increase. In other words, adding new services to a village health and family planning program involve minimal increases in supportive costs, thus decreasing unit costs for all services. This comparison is best illustrated between FP-Education, FP+WS and FP+WS+CC. The FP+CC villages are somewhat of an exception, again primarily related to much more intensive child care due to overlap with the nutrition project. Increases in expenditures on drugs and costs of nutritional supplements (both costs allocated completely to direct services) as well as more time spent on direct services produced these dramatic variations in direct service costs.

Annual estimated government costs for similar services

Tables III.D.6 - III.D.10 convert the data from the five previous tables to estimated costs the Punjab government might experience running identical service programs. Across the board in each experimental group and in every year these estimated costs are around 50 percent less

than the expenditures experienced by RHRC. This reduction holds for both children's and women's services except in the FP+CC experimental group where from 1970 to 1972 reductions in costs of child care were even greater due to exclusion in the government estimates of staff related primarily to the needs of the overlapping nutrition project.

Reductions in family planning costs were generally in the neighborhood of the 50 percent level also. The main exceptions to this were in 1972 and 1973 in the FP+WS and FP+CC experimental groups, where reductions reached as high as 70 percent. The reasons for these greater savings are the standard staffing patterns assumed across the experimental groups. An example was the provision for one physician for all services in the FP+CC experimental group instead of the two (a male physician for child care and a lady physician for family planning) used by RHRC. This type of standardization makes comparisons between experimental groups possibly more realistic in terms of their eventual comparative costs and effectiveness.

Cost of service contacts

Comparison of expenditures in the different experimental groups can be misleading unless the volume of services generated by each group is related to the total costs of those services. The average cost per service contact therefore was calculated and is presented in Tables III.D.11 through III.D.13. Contacts recorded in the service records were used for the 1969-1973 calculations and contacts observed during work sampling were used for estimates of the cost per contact in 1974. (Since the latter were collected in early 1974, expenditures for 1973 were used in the calculations.) The latter are especially pertinent for comparison with estimates of the cost per service contact in government primary health centers of Punjab in 1968 shown in Table III.D.14. (The government costs were ascertained in the Functional Analysis Project during 1968-69 and utilized the contacts observed during work sampling of primary health center staff.) In order to permit a more realistic comparison of cost per recorded contact between years of the project, an 8 percent* annual rate of inflation was assumed and used to standardize costs to 1970 levels. The adjusted costs are presented alongside the actual costs.

*Estimated from the average annual increase in prices of supplies, drugs, etc. and the approximate annual increment in individual salaries during 1969-1973.

The left half of Table III.D.11 gives the cost per children's service contact, lumping together all types of services. This unit cost was generally higher in the FP+CC experimental group than in the FP+WS+CC group, but both ranged between one and two rupees per contact. Standardizing to 1970 prices tended to decrease the overall spread. Cost per observed contact in 1974 was about half as much as the cost per recorded contact in 1973 reflecting the previously mentioned difference between numbers of observed and recorded contacts. Using the estimated government equivalent expenditures the cost per recorded contact was lowered to between 0.60 and 1.00 rupees at 1970 price levels. Costs per observed contacts, even at 1974 prices, compare very favorably with the costs per illness and MCH contacts in the Punjab primary health centers in 1968 (Table III.D.14).

Costs for the different types of children's services were also determined (not shown in the tables). Illness care contacts were found to be about twice the cost of the average of all types of contacts given in the tables, while the cost of preventive service contacts was about half as much as the average for all contacts.

The second half of Table III.D.11 shows the average cost per child feeding provided by the nutrition supplementation program. These were fairly stable when related to 1970 prices and averaged around 0.23 and 0.30 rupees in the FP+WS+CC and FP+CC experimental groups respectively. For children receiving the standard two feedings per day the daily cost of their food supplement was therefore half a rupee. Seventy percent of this cost was the value of the food itself, while the remainder was related to expenditures on salaries, supplies, etc. The estimated government expenditures based on assumption that a good portion of the food would come from donor agencies or the community, reduced the cost per feeding more than half.

The cost per contact related to women's services is presented in Table III.D.12. Except for 1969 (which was the year in which women's services were being developed) these costs are fairly constant with the FP+WS experimental group averaging more per contact than the other two groups In addition women's service contacts appear to run at least one rupee more per contact than contacts for child care. The explanation of this higher amount lies in the cost of maternity contacts which averaged over 6 rupees

contact. Otherwise costs of illness care and preventive service contacts for women were very similar to those for children. Within the maternity function, the cost of antenatal contacts averaged around 9 rupees while postnatal contacts were only half as costly. The standardization to 1970 prices and the effect of using estimated government cost levels is similar to that for children's service costs. Again cost per observed contact is well within the range of the Punjab primary health center levels of 1968.

The costs of family planning contacts showed the greatest variation among the experimental groups as well as between observed and recorded contacts (Table III.D.13). Cost per recorded contact was the least in the FP+WS+CC experimental group with the FP+WS group being intermediate in cost and the FP+CC and FP-Education experimental groups having the most expensive contacts. The difference between the latter two experimental groups and FP+WS+CC was three- to four-fold. In each experimental group the cost per contact in the initial year of service was always much higher than in subsequent years, something that would be expected in the take-off stages of a program. As with other types of contacts, cost per observed contact was less than for recorded contacts. However, in this case, the difference between experimental groups is much less indicating many more non-recorded contacts in all the experimental groups other than FP+WS+CC as discussed previously. Using these unit costs the FP+WS experimental group provides the least costly family planning per contact. Comparison with the 1968 Punjab primary health center family planning contacts shows that the RHRC estimated government equivalent cost per observed contact in 1974 was about one rupee less. The one exception was the FP-Education experimental group where the cost per observed contact was only slightly less than the Punjab primary health center.

The cost of specific types of family planning contacts varied. Preacceptance contacts cost about one and a half times more than the average of all family planning contacts. For example, in 1971 in the FP+WS+CC experimental group they were Rs. 6.23. The cost per contact for actual provision of contraceptive services ranged between two to three times the average cost for all family planning contacts while followup contacts cost less than half of the average cost. This meant that the cost of each

preacceptance contact was three to four times greater than the cost of a followup contact, an important consideration when planning the resources required for a family planning program.

Table III.D.14 provides an excellent illustration of the need to interpret total program costs with caution. If the total annual family planning cost per 1,000 population of the primary health center is compared with the government equivalent cost of family planning in the FP+WS experimental group (Tables III.D.6 - III.D.10) the latter is more than twice as costly. However, as mentioned above, the cost per observed contact in the FP+WS experimental group is half as much as that in the Punjab primary health center. Put in another way, if the Punjab primary health center had been as efficient as this experimental group they could have theoretically covered a population twice the size they actually served or doubled the contacts with their service population at no additional cost. In reality this would depend on acceptance and utilization of the services by the village population.

Table III.D.1

ANNUAL EXPENDITURES PER 1000 POPULATION FOR SPECIFIC FUNCTIONS AND SERVICES IN EACH EXPERIMENTAL GROUP, 1969, RESEARCH COSTS EXCLUDED
(Rupees*)

	FUNCTIONS AND SERVICES	EXPERIMENTAL GROUP FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	1,568	165	4,725
	3+ yrs.	943	63	1,310
	Preventive <3 yrs.	940	117	1,035
	3+ yrs.	46	-	38
	Nutrition	4,141	-	6,833
	Subtotal	7,638	345	13,941
WOMEN'S SERVICES	Illness <50 yrs.	2,465	4,243	604
	50+ yrs.	578	375	-
	Preventive	166	423	167
	Maternity	1,356	2,555	712
	Subtotal	4,565	7,596	1,483
FAMILY PLANNING		1,494	2,673	-
MEN		181	167	150
TOTAL		13,878	10,781	15,574
	Direct Service	7,344	3,440	8,235
	Supportive Activities	5,694	6,007	6,431
	Non-Productive	840	1,334	908

*Conversion of Rupees to U.S. dollars: 7.5 Rupees = $1.

Table III.D.2

ANNUAL EXPENDITURES PER 1000 POPULATION FOR SPECIFIC FUNCTIONS AND SERVICES IN EACH EXPERIMENTAL GROUP, 1970, RESEARCH COSTS EXCLUDED
(Rupees)

		EXPERIMENTAL GROUP		
FUNCTIONS AND SERVICES		FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	2,080	206	5,429
	3+ yrs.	1,216	78	1,502
	Preventive <3 yrs.	1,192	156	1,277
	3+ yrs.	59	-	47
	Nutrition	4,393	-	6,784
	Subtotal	8,940	440	15,039
WOMEN'S SERVICES	Illness <50 yrs.	3,489	5,420	709
	50+ yrs.	756	807	-
	Preventive	208	491	182
	Maternity	1,905	3,390	874
	Subtotal	6,358	10,108	1,765
FAMILY PLANNING		1,611	3,069	-
MEN		208	199	174
TOTAL		17,117	13,816	16,978
	Direct Service	9,283	4,664	8,317
	Supportive Activities	6,860	7,652	7,622
	Non-Productive	974	1,500	1,039

Table III.D.3

ANNUAL EXPENDITURES PER 1000 POPULATION FOR SPECIFIC FUNCTIONS AND SERVICES IN EACH EXPERIMENTAL GROUP, 1971, RESEARCH COSTS EXCLUDED
(Rupees)

	FUNCTIONS AND SERVICES	EXPERIMENTAL GROUP		
		FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	2,385	268	6,169
	3+ yrs.	1,448	105	1,733
	Preventive <3 yrs.	1,519	154	1,458
	3+ yrs.	80	-	47
	Nutrition	4,854	-	6,189
	Subtotal	10,286	527	15,596
WOMEN'S SERVICES	Illness <50 yrs.	3,905	6,907	791
	50+ yrs.	1,032	1,127	-
	Preventive	225	551	205
	Maternity	1,953	3,911	811
	Subtotal	7,115	12,496	1,807
FAMILY PLANNING		1,969	3,625	5,663
MEN		265	260	272
TOTAL		19,635	16,908	23,338
	Direct Service	10,467	5,711	10,074
	Supportive Activities	7,936	9,312	11,234
	Non-Productive	1,232	1,885	2,030

Table III.D.4

ANNUAL EXPENDITURES PER 1000 POPULATION FOR SPECIFIC FUNCTIONS AND SERVICES IN EACH EXPERIMENTAL GROUP, 1972, RESEARCH COSTS EXCLUDED
(Rupees)

	FUNCTIONS AND SERVICES	EXPERIMENTAL GROUP			
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN'S SERVICES	Illness <3 yrs.	2,110	238	5,034	22
	3+ yrs.	1,275	93	1,420	11
	Preventive <3 yrs.	1,235	150	1,372	6
	3+ yrs.	64	-	44	-
	Nutrition	4,944	-	7,026	-
	Subtotal	9,628	481	14,896	39
WOMEN'S SERVICES	Illness <50 yrs.	3,404	5,739	679	410
	50+ yrs.	955	1,002	-	46
	Preventive	206	529	212	110
	Maternity	1,786	3,513	798	143
	Subtotal	6,351	10,783	1,689	709
FAMILY PLANNING		1,824	3,240	5,433	8,405
MEN		248	231	247	88
TOTAL		18,051	14,735	22,265	9,241
	Direct Service	9,748	4,664	9,682	2,208
	Supportive Activities	7,212	8,387	10,698	6,084
	Non-Productive	1,091	1,684	1,885	949

Table III.D.5

ANNUAL EXPENDITURES PER 1000 POPULATION FOR SPECIFIC FUNCTIONS AND SERVICES IN EACH EXPERIMENTAL GROUP, 1973, RESEARCH COSTS EXCLUDED
(Rupees)

	FUNCTIONS AND SERVICES	EXPERIMENTAL GROUP			
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN'S SERVICES	Illness <3 yrs.	1,141	139	4,728	15
	3+ yrs.	1,125	105	1,516	7
	Preventive <3yrs.	674	46	1,067	5
	3+ yrs.	24	-	76	-
	Nutrition	4,123	-	5,540	-
	Subtotal	7,087	290	12,927	27
WOMEN'S SERVICES	Illness <50 yrs.	3,866	3,782	1,014	329
	50+ yrs.	1,212	849	62	36
	Preventive	251	511	211	99
	Maternity	1,665	2,474	699	109
	Subtotal	6,994	7,616	1,986	573
FAMILY PLANNING		2,266	3,996	3,928	7,845
MEN		256	133	88	88
TOTAL		16,603	12,035	18,929	8,533
	Direct Service	8,796	4,280	9,316	1,839
	Supportive Activities	7,127	6,856	8,705	5,929
	Non-Productive	680	899	908	765

Table III.D.6

ANNUAL ESTIMATED GOVERNMENT EXPENDITURES PER 1000 POPULATION THAT WOULD BE REQUIRED FOR EACH EXPERIMENTAL GROUP, 1969, RESEARCH COSTS EXCLUDED
(Rupees)

FUNCTIONS AND SERVICES		EXPERIMENTAL GROUP		
		FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	818	81	2,450
	3+ yrs.	500	28	684
	Preventive <3 yrs.	546	75	570
	3+ yrs.	25	-	20
	Nutrition	1,801	-	2,933
	Subtotal	3,690	184	6,667
WOMEN'S SERVICES	Illness <50 yrs.	1,245	2,103	292
	50+ yrs.	291	186	-
	Preventive	102	251	107
	Maternity	737	1,416	378
	Subtotal	2,355	3,956	777
FAMILY PLANNING		809	1,420	-
MEN		100	81	69
TOTAL		6,974	5,641	7,513
Direct Service		3,476	1,881	3,616
Supportive Activities		2,979	2,924	3,413
Non-Productive		499	836	484

Table III.D.7

ANNUAL ESTIMATED GOVERNMENT EXPENDITURES PER 1000 POPULATION THAT WOULD BE REQUIRED FOR EACH EXPERIMENTAL GROUP, 1970, RESEARCH COSTS EXCLUDED
(Rupees)

FUNCTIONS AND SERVICES		EXPERIMENTAL GROUP		
		FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	1,010	92	2,606
	3+ yrs.	609	31	729
	Preventive <3 yrs.	590	84	657
	3+ yrs.	28	-	23
	Nutrition	1,880	-	2,871
	Subtotal	4,117	207	6,886
WOMEN'S SERVICES	Illness <50 yrs.	1,607	2,377	315
	50+ yrs.	347	354	-
	Preventive	108	267	112
	Maternity	915	1,605	417
	Subtotal	2,977	4,603	844
FAMILY PLANNING		802	1,432	-
MEN		109	88	71
TOTAL		8,005	6,330	7,801
Direct Service		4,298	2,416	3,718
Supportive Activities		3,190	3,050	3,582
Non-Productive		517	864	501

Table III:D:8

ANNUAL ESTIMATED GOVERNMENT EXPENDITURES PER 1000 POPULATION THAT WOULD BE REQUIRED FOR EACH EXPERIMENTAL GROUP, 1971, RESEARCH COSTS EXCLUDED
(Rupees)

FUNCTIONS AND SERVICES		EXPERIMENTAL GROUP		
		FP+WS+CC	FP+WS	FP+CC
CHILDREN'S SERVICES	Illness <3 yrs.	1,101	105	2,678
	3+ yrs.	697	36	759
	Preventive <3 yrs.	711	83	643
	3+ yrs.	34	-	21
	Nutrition	2,041	-	2,594
	Subtotal	4,584	224	6,695
WOMEN'S SERVICES	Illness <50 yrs.	1,702	2,702	321
	50+ yrs.	449	442	-
	Preventive	116	291	105
	Maternity	867	1,668	335
	Subtotal	3,134	5,103	761
FAMILY PLANNING		843	1,478	1,582
MEN		123	95	97
TOTAL		8,684	6,900	9,135
	Direct Service	4,764	2,711	4,403
	Supportive Activities	3,327	3,297	4,045
	Non-Productive	533	892	687

Table III.D.9

ANNUAL ESTIMATED GOVERNMENT EXPENDITURES PER 1000 POPULATION THAT WOULD BE REQUIRED FOR EACH EXPERIMENTAL GROUP, 1972, RESEARCH COSTS EXCLUDED
(Rupees)

FUNCTIONS AND SERVICES		EXPERIMENTAL GROUP			
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN'S SERVICES	Illness <3 yrs.	1,027	102	2,227	10
	3+ yrs.	643	36	633	5
	Preventive <3 yrs.	649	91	622	4
	3+ yrs.	31	-	20	-
	Nutrition	2,187	-	2,979	-
	Subtotal	4,537	229	6,481	19
WOMEN'S SERVICES	Illness <50 yrs.	1,572	2,461	284	200
	50+ yrs.	441	428	-	22
	Preventive	119	300	109	61
	Maternity	869	1,684	357	67
	Subtotal	3,001	4,873	750	350
FAMILY PLANNING		873	1,483	1,682	4,037
MEN		125	94	92	46
TOTAL		8,536	6,679	9,005	4,452
	Direct Service	4,520	2,340	4,123	1,093
	Supportive Activities	3,464	3,416	4,175	2,931
	Non-Productive	552	917	707	428

Table III.D.10

ANNUAL ESTIMATED GOVERNMENT EXPENDITURES PER 1000 POPULATION WHAT WOULD BE REQUIRED FOR EACH EXPERIMENTAL GROUP, 1973, RESEARCH COSTS EXCLUDED
(Rupees)

		EXPERIMENTAL GROUP			
FUNCTIONS AND SERVICES		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
CHILDREN'S SERVICES	Illness <3 yrs.	563	75	2,574	9
	3+ yrs.	614	58	811	4
	Preventive <3 yrs.	426	31	724	4
	3+ yrs.	15	-	45	-
	Nutrition	1,945	-	2,420	-
	Subtotal	3,563	164	6,574	17
WOMEN'S SERVICES	Illness <50 yrs.	2,030	1,991	536	196
	50+ yrs.	656	470	38	21
	Preventive	166	345	151	62
	Maternity	847	1,336	447	62
	Subtotal	3,699	4,142	1,172	341
FAMILY PLANNING		1,254	2,343	2,125	4,410
MEN		133	73	42	47
TOTAL		8,649	6,722	9,913	4,815
	Direct Service	4,309	2,379	4,684	1,102
	Supportive Activities	3,935	3,820	4,697	3,273
	Non-Productive	405	523	532	440

E R R A T A

Table III.D.11

AVERAGE COST PER CHILDREN'S HEALTH SERVICE CONTACT AND NUTRITION SUPPLEMENTATION FEEDING IN THE FP+WS+CC AND FP+CC EXPERIMENTAL GROUPS FOR EACH YEAR OF SERVICE RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES (Recorded Contacts 1969-1973, Observed Contacts 1974)

	YEAR	HEALTH SERVICES		NUTRITION	
		FP+WS+CC	FP+CC	FP+WS+CC	FP+CC
RHRC	1969	1.19 (1.29)	1.70 (1.84)	0.23 (0.25)	0.27 (0.29)
	1970	1.21	1.46	0.24	0.29
	1971	1.44 (1.33)	1.80 (1.67)	0.24 (0.22)	0.32 (0.30)
	1972	1.93 (1.65)	1.62 (1.39)	0.26 (0.22)	0.40 (0.34)
	1973	1.59 (1.26)	2.24 (1.78)	0.30 (0.24)	0.33 (0.26)
	1974	0.92	1.25	-	-
GOVT. EST.	1969	0.64 (0.69)	0.89 (0.96)	0.10 (0.11)	0.12 (0.13)
	1970	0.60	0.71	0.10	0.12
	1971	0.67 (0.62)	0.79 (0.73)	0.10 (0.09)	0.13 (0.12)
	1972	0.97 (0.83)	0.72 (0.62)	0.11 (0.09)	0.17 (0.15)
	1973	0.87 (0.69)	1.26 (1.00)	0.14 (0.11)	0.14 (0.11)
	1974	0.50	0.70	-	-

Note: Numbers in parenthesis are calculated using expenditures adjusted to 1970 prices assuming an annual rate of inflation of 8 percent. Costs per observed contacts in 1974 were estimated using 1973 expenditure levels and work sampling data from early 1974.

Table III.D.11

AVERAGE COST PER CHILDREN'S HEALTH SERVICE CONTACT AND NUTRITION SUPPLEMENTATION FEEDING IN THE FP+WS+CC AND FP+CC EXPERIMENTAL GROUPS FOR EACH YEAR OF SERVICE RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES
(Recorded Contacts 1969-1973, Observed Contacts 1974)

	YEAR	HEALTH SERVICES		NUTRITION	
		FP+WS+CC	FP+CC	FP+WS+CC	FP+CC
RHRC	1969	1.19 (1.29)	1.70 (1.84)	0.23 (0.25)	0.27 (0.29)
	1970	1.21	1.46	0.24	0.29
	1971	1.44 (1.33)	1.80 (1.67)	0.24 (0.22)	0.32 (0.30)
	1972	1.93 (1.65)	1.88 (1.61)	0.26 (0.22)	0.40 (0.34)
	1973	1.59 (1.26)	2.24 (1.78)	0.30 (0.24)	0.33 (0.26)
	1974	0.92	1.25	-	-
GOVT. EST.	1969	0.64 (0.69)	0.89 (0.96)	0.10 (0.11)	0.12 (0.13)
	1970	0.60	0.71	0.10	0.12
	1971	0.67 (0.62)	0.79 (0.73)	0.10 (0.09)	0.13 (0.12)
	1972	0.97 (0.83)	0.84 (0.72)	0.11 (0.09)	0.17 (0.15)
	1973	0.87 (0.69)	1.26 (1.00)	0.14 (0.11)	0.14 (0.11)
	1974	0.50	0.70	-	-

Note: Numbers in parenthesis are calculated using expenditures adjusted to 1970 prices assuming an annual rate of inflation of 8 percent. Costs per observed contacts in 1974 were estimated using 1973 expenditure levels and work sampling data from early 1974.

Table III.D.12

AVERAGE COST PER WOMEN'S SERVICE CONTACT IN THE EXPERIMENTAL GROUPS WITH THESE SERVICES DURING EACH YEAR OF THE PROJECT RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES (Recorded Contacts 1969-1973, Observed Contacts 1974)

	YEAR	EXPERIMENTAL GROUP		
		FP+WS+CC	FP+WS	FP+CC
RHRC	1969	3.89 (4.20)	5.39 (5.82)	17.87 (19.30)
	1970	2.51	3.07	2.99
	1971	2.53 (2.34)	3.94 (3.65)	2.85 (2.64)
	1972	2.38 (2.04)	3.70 (3.17)	2.45 (2.10)
	1973	2.76 (2.19)	2.56 (2.03)	2.76 (2.19)
	1974	1.35	1.32	0.76
GOVT. EST.	1969	2.00 (2.16)	2.81 (3.03)	9.36 (10.11)
	1970	1.18	1.40	1.43
	1971	1.12 (1.04)	1.61 (1.49)	1.20 (1.11)
	1972	1.12 (0.96)	1.67 (1.43)	1.09 (0.93)
	1973	1.46 (1.16)	1.39 (1.10)	1.63 (1.29)
	1974	0.71	0.72	0.45

Note: Numbers in parenthesis are calculated using expenditures adjusted to 1970 prices assuming an annual rate of inflation of 8 percent. Costs per observed contacts in 1974 were estimated using 1973 expenditure levels and work sampling data from early 1974.

Table III.D.13

AVERAGE COST PER FAMILY PLANNING CONTACT IN EACH EXPERIMENTAL GROUP
FOR EACH YEAR OF FAMILY PLANNING SERVICES
RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES
(Recorded Contacts 1969-1973, Observed Contacts 1974)

	YEAR	EXPERIMENTAL GROUP			
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.
RHRC	1969	8.16 (8.82)	11.52 (12.44)	-	-
	1970	3.85	7.40	-	-
	1971	4.31 (3.99)	6.00 (5.56)	18.27 (16.92)	-
	1972	3.09 (2.65)	3.57 (3.06)	11.79 (10.11)	14.85 (12.73)
	1973	3.48 (2.76)	5.65 (4.49)	13.78 (10.94)	11.50 (9.13)
	1974	2.79	2.10	2.92	3.84
GOVT. EST.	1969	4.42 (4.77)	6.12 (6.61)	-	-
	1970	1.92	3.45	-	-
	1971	1.84 (1.70)	2.45 (2.27)	5.10 (4.72)	-
	1972	1.48 (1.27)	1.63 (1.40)	3.65 (3.13)	7.13 (6.11)
	1973	1.93 (1.53)	3.31 (2.63)	7.46 (5.92)	6.47 (5.14)
	1974	1.54	1.23	1.58	2.16

Note: Numbers in parenthesis are calculated using expenditures adjusted to 1970 prices assuming an annual rate of inflation of 8 percent. Costs per observed contacts in 1974 were estimated using 1973 expenditure levels and work sampling data from early 1974.

Table III.D.14

TOTAL ANNUAL EXPENDITURES AND SERVICE CONTACTS PER 1000 POPULATION AND AVERAGE EXPENDITURE PER SERVICE CONTACT IN TWO PRIMARY HEALTH CENTERS IN PUNJAB, 1968

ITEM	FUNCTION*					
	ILLNESS	MCH	FP	CDC	ENV.	TOTAL
Total Annual Expenditures Per 1000 Population (Rs.)	542	182	635	506	14	1,879
Total Annual Observed Service Contacts Per 1000 Population	893	220	254	3,707	18	5,093
Expenditure Per Service Contacts (Rs.)	0.61	0.83	2.50	0.14	0.78	0.37

*MCH = Maternal and Preventive Child Care Services
FP = Family Planning
CDC = Mass Communicable Disease Control (Malaria Surveillance and Smallpox Vaccinations)
ENV = Environmental Sanitation

Note: One Primary Health Center covered a population of about 85,000.

E. INNOVATIONS IN TRAINING, SUPERVISION AND THE DEVELOPMENT OF FIELD MANUALS

Training at Narangwal

Underlying the whole approach at Narangwal was a basic educational orientation. All staff members in the project were involved in educating themselves and others. The work in the villages obviously had a large educational component. Much of the process of defining a new pattern of work for the health center team had the purpose of simplifying and specifying work routines as a basis for a reformation of the education of health center personnel. In order to extend the Narangwal pattern of services it would be essential to develop means of rapidly preparing large numbers of persons with the new orientation.

From the beginning, therefore, it was a clear objective to experiment with various educational methods to define those that worked best and most efficiently under village conditions. It was apparent that the best way of working on this question was through using the training of our own field workers as a test group. A consistent policy was maintained that involved trying out various approaches to education in the same sort of evolutionary approach that was used in developing services.

The training was systematically developed mainly for the auxiliary workers and these efforts will be described here under the headings of (a) pre-posting training which was a special educational program after selection and before assignment to independent responsibility in the village, and (b) continuing inservice training.

(a) Pre-posting training programs were evolved for the FHWs, FHSs, FPEs, and FPWs. These programs, especially in the case of the FHW, were meant to reinforce those parts of previous training that were appropriate, introduce new areas of responsibility for which no previous training had been given, and orient the individual to village-level work. Basic to the latter were development of understanding and appreciation of village people and their needs. Areas which required special attention and innovation were: new work patterns, acceptance of delegated responsibility from the physician, and development of the ability to participate actively in the evolution of the services.

Training of the FHW at first was rather elaborate even though somewhat ad hoc. By 1970 a well-structured two-month course with lectures and field experience had been organized. Then a deliberate effort to simplify led to a sharp scrutiny of all that had been introduced and consequent elimination of much that was academically attractive but of dubious value to actual work performance. By the end of the project the total time had been reduced to a six to eight week period during which a series of lecture-discussion sessions were concentrated into periods of 7 to 10 days; these alternated with similar full-time periods of apprenticeship with an experienced FHW in a subcenter. Of the educational innovations we introduced, this pattern of alternative academic work and preceptorship was the most productive. The periods of practical field work tremendously accelerated learning in the academic periods.

FPWs and FPEs received similarly structured training but with somewhat less field exposure. Their training programs, however, did not develop to the same degree of refinement because of the fewer numbers of staff and therefore the reduced number of times the training had to be given.

(b) Continuing education and in-service training of the field staff was conducted primarily through a weekly full day of lectures, demonstrations, and discussions, with all of the staff being brought together while the subcenters were closed for the day. In these sessions, proposed new innovations in the village services were introduced and worked out with the field personnel. Important aspects of the current activities of the workers were reviewed in a regular rotation. For example, before each hot dry season, the treatment of diarrhea and dehydration was reviewed.

A series of village conferences was instituted for the FHWs in 1972. These alternated on a bi-weekly basis with the full day training sessions at Narangwal, which also became bi-weekly at this time. In fact, the actual result was that half of the training activities were moved out to the subcenters. These village conferences supplied a forum for review by the whole service team of the previous month's work of a particular FHW in the presence of other FHWs in her group of villages. These helped greatly both to maintain standards of performance and also to crystallize in a very practical way the continued training and refreshing of the knowledge of FHWs.

The training of the professional members of the staff was just as intense though less formally structured than the village workers sessions. Doctors especially had to learn a whole new role which was sometimes traumatic. It proved extremely difficult for them to learn that during a supervisory visit or a referral their primary responsibility was to work through the village personnel. They had to learn that they could not take over without interfering with the FHWs relationship with her village, that normally they had to ask for information through the FHW rather than directly, and that they should let the FHW carry out the treatment if it was at all within her capabilities. The basic dictum was that after a supervisory visit the status and prestige of the FHW in the minds of village people and her own self-image must be higher than before the visit. The public health nurses were a great help to the doctors in learning this role.

2. Manuals and Standing Orders

By the end of the project, well worked out manuals had been developed only for the FHW. Patterns of work were well established for the remainder of the staff, but these had not been formulated into a publishable written format.

The FHW field manuals began as a collection of mimeographed guidelines and instructions. These were then developed into a comprehensive and coherent service pattern, comprising all the women's, children's, and family planning services. An integral part of the manuals were standing orders covering all clinical situations the FHW would encounter and providing specific stepwise instructions in diagnosis, treatment, or referral. These manuals were used both in training and as a ready reference in the subcenter.

These documents went through many revisions coming directly out of field experience as the process of preparing the manuals for use throughout India was begun. This culminated in the publication of the Child Care Manual for ANMs. (Editing and publication of the remainder of the manuals for women's services and family planning were in the process of final revision when the project was terminated. Experience in the nutrition program also permitted us to edit Maurice King's Nutrition Manual for Africa into an Indian version which is ready for publication.)

Other training materials that were developed included guidelines for systematic family planning entry points, a cardboard "dial-clock" for determining the appropriate family planning approach according to at-risk categories and stages in the reproductive cycle, patient record systems, and other service forms and records.

3. Supervision and Morale

One of the most important considerations in the successful implementation and continuation of a good service program is the level and quality of supervision. Systematic supervisory patterns were built into the training periods, manual guidelines, field forms, and staffing patterns. For example, the FHS was routinely required to spend a full day every week with each FHW participating in their subcenter clinic and home visiting. The reminder cards and records were constructed so as to permit rapid review by the supervisor. Village conferences required the FHW and PHNs to abstract the FHW's records each month. The FHSs and PHNs prepared most of the training sessions and participated in them. In addition, special check lists were also used to improve supervision during spot check visits. Early in the research effort a special series of seminars was organized for all supervisory staff in which in-depth exploration was shared of insights available from the literature about alternative supervisory approaches and their strengths and weaknesses.

Important as all these details were, it was felt that even more important were the attitudes of all levels of workers towards supervision and the ability to achieve open communication between worker and supervisor. "Supportive" supervision was stressed in comparison to authoritative, disciplinary types of relationships. The FHS was to help the FHW develop her technical abilities and especially to use a problem solving approach as a learning device. The FHW was encouraged to discuss on an equal basis with her supervisors her work and her problems and make suggestions for change when situations seemed unworkable. Since the FHW was recognized to be the key worker in the field services, an open, supportive relationship between FHWs and supervisors became a high priority. Good morale and effective teamwork were demonstrated to be attainable under these circumstances. Similar supervisory patterns were developed with the FPW and the FPE.

SECTION IV

ACHIEVEMENTS IN FAMILY PLANNING, FERTILITY AND HEALTH

SECTION IV.

ACHIEVEMENTS IN FAMILY PLANNING, FERTILITY AND HEALTH

SUMMARY OF ACHIEVEMENTS

The results of the Narangwal studies have to be placed in the perspective of the ambitious goals. Since the project was terminated prematurely we feel that we raised more questions than we answered. Therefore, before presenting the detailed findings, we feel it is important to summarize our view of the overall achievements of the project in relation to our objectives.

The second general objective of evolving a demonstration of integrated MCH/FP services for Indian conditions was thoroughly achieved. Both a field program and a training program were worked out in great detail as described in Sections I and III of this report. What is more, each component of the service package has a "price tag" attached to it to guide the planner in putting together adaptive packages appropriate for local needs. This Narangwal pattern of service was in fact very similar to those which have been proposed for implementation both in the Punjab and nationally, and also the proposals which are part of the Fifth Five Year Plan.

The first general objective dealt with testing specific research hypotheses and here the achievements are only partial. We have some indication of what the results might have been if the project had continued and can analyze with confidence some interactions between the multiple forces influencing fertility. Because our data were longitudinal we can arrive at judgements about causality and the dynamics of interactions with more confidence than most studies where results are based on shorter term or cross-sectional studies. For the most important questions that we were asking we showed mainly that more time would be needed for definitive answers.

It seems probable that the first answer that we would have gotten with 1-2 years more of field work would have been the plateau levels of family planning utilization in FP-Ed and FP+WS. We think these would have plateaued in this additional amount of time mainly because of informal feedback from the village workers. After only one year of intensive village work, even with the most rapid increment in family planning utilization, the FPEs were placing great pressure on their supervisors to give them something more

to discuss with village women than just family planning. They moved into discussing home economics and women's activities in general just to keep good rapport in the village. Similarly, in FP+WS the field workers were becoming increasingly open about expressing the demand on them from village people to do something about child care. The general impressions they conveyed to us was that they had gone about as far as they could go with integrated services only for women.

From the beginning we knew that to test the child survival hypothesis would take at least five years because of the postulated lag between perception of child survival and its impact on family planning motivation. We had also concluded much earlier that the traditional statement of the child survival hypothesis was erroneous. We felt the impact would not be a conscious decision to have fewer births either as "replacement" for children who had died or as "insurance" against the possibility that some might die. Our first surveys of attitudes included questions asking whether any such conscious motivational tendency was operating. Responses showed most often that they had "never thought of it," or that the response was negative. At the same time in other responses cross tabulations showed marked correlations between those who had lost children and disapproval of family planning, high ideal of family size, etc. Because of these findings our service approach tried to link child care with family planning entry points in order to accelerate perception of child survival, openly discuss the issues following recovery from illnesses and to use the new awareness as direct motivation for family planning. The data in Section II.C. show that we failed in this objective in FP+CC but succeeded in FP+WS+CC. The reason was obvious to us because in FP+CC we had a male pediatrician supervising the child care and a woman doctor supervising the family planning so that in the minds of FHWs the services were never integrated. The fact is that the performance and plateau in FP+CC can be considered an example of FP-Ed services except for any spontaneous awareness of improved child survival that may have eventually permeated the subconscious orientation of the villagers. As in all villages other than FP+WS+CC, however, the second survey showed that FP+CC had a smaller percentage saying more children were surviving than in

the first survey even though child mortality had been halved and infant mortality had declined more than in FP+WS+CC.

Our feeling is that it would have taken another 2-3 years to really see the impact of improved child survival in the villages with child care services. The plateauing in these villages would have then possibly occurred somewhat later, but our data give no indication of where that plateau level would have been relative to other experimental groups.

Of ultimate importance, of course, is the question of how family planning utilization affects fertility rates. We were favorably surprised with the impact on all fertility indices. In fact, the impact in FP-Ed. was so great as to strain credibility. There are many things wrong with the vital rates data in this group of villages which arise mostly from the short period of observation. We are concerned about the retrospective nature of much of the information, there is an unexplained difference in the age distribution of women, and the time is just too short for a real family planning effect from our program. The villages were well covered by the services of a government primary health center and it is possible that part of the impact may have come from increased activities on their part prior to our active involvement. In any case, the fertility changes in other experimental groups fit well with family planning utilization patterns.

The health benefits were dramatic for children. Mostly this could be attributed to our child care services. We also showed a clear relationship of child health indicators with birth order and family size.

A. ACCEPTANCE AND PRACTICE OF FAMILY PLANNING

Acceptance and practice of family planning was a cumulative phenomenon. When services were first offered there was an initial surge of acceptance by people who were already motivated and were presumably shifting from traditional village methods. The intensity with which the program was started determined the rate at which these already motivated couples were included. Then the really important process started of reaching those couples who were ambivalent or worried about rumors of complications. This took persistent, person-to-person communication and the development of trust in the FHW.

Family planning services were not introduced in all of the experimental groups simultaneously. Also all villages in a particular group did not start receiving services at the same time. In all four villages of FP+WS+CC and three of the FP+WS villages family planning was started in 1969. The remaining FP+WS villages and all three child care villages started receiving family planning in December 1970 and the four FP-Ed. villages in June 1972. The month and year when family planning was started in different villages was presented in Table I.B.1 in Section I. In computing the increase in ever-user and continuing-user rates starting from a specified point in time these dates were taken into consideration so that both numerators and denominators (users and eligible women) were only included for those villages in a group in which family planning services had already been started at the specified time.

1. Recipients of Family Planning Services

As discussed earlier, both wives and husbands received family planning advice and services. Among couples who received services there were both residents and non-residents. Non-residents were usually daughters who came for delivery or were visiting their parents. Table IV.A.1 shows that about 15 percent of all couples who received family planning services in the study area were non-residents. The percent of non-residents were respectively 14, 26, 8 and 5 in the FP+WS+CC, FP+WS, FP+CC AND FP-Ed. groups.

2. Ever-users of Family Planning

When services were started in all four experimental groups, the proportion of women who had ever used a family planning method was between 7 and 14 percent. Similar data was not available in the control villages where we did not have a longitudinal family planning data collection system. However, in a baseline cross-sectional survey in these villages reported in Section II.D., 9 percent of eligible women said they were currently using modern contraceptives. The two groups, FP+WS+CC and FP+WS which received family planning services for over four years reached ever-user rates of 51 percent and 54 percent respectively. The FP+CC group of villages which received family planning services for over three years reached 46 percent.

A little over one and a half years of program operation in the FP-Ed. group produced an ever-user rate of 37 percent. A repeat cross-sectional survey midway through the project in 1972 showed no changes in the previously mentioned 9 percent use rate in the control villages. Although definite under-reporting of use was identified as a problem in the cross-sectional surveys, the important finding for the control villages is the lack of any change in their rates between the two surveys. For the four experimental groups, ever-user rates were computed as of March, June, September, and December of each calendar year and these are presented in Table IV.A.2 and plotted in Figure IV.A.1. The acceptance curves lead to three observations: (1) In general, throughout the program period the curves are remarkably parallel; (2) there is no indication yet of the curves flattening; and (3) the lower the initial rate of use, the faster was the take-off.

The last observation deserves comment. The lowest of the initial ever-user rates was in the FP-Ed group and next to the lowest in the FP+CC group. It should also be noted that the family planning services were started in these two groups almost three years and one and a half years after they were started in the other two service groups. The experience and systematization of services developed in the earlier villages were readily applied in the groups started later and this may account for their faster take-off. An additional consideration is that the slower tooling up time in the earlier villages permitted us to identify all those couples who had practiced family planning prior to the start of our project. In the two experimental groups that were started later, programs were initiated with minimum tooling up time so there may have been more tendency to identify couples who had previously been acceptors as "new" acceptors.

3. Continuing-users of Family Planning

Of most importance for family planning impact are figures on continuing use by couples of family planning methods. The proportions of women who were practicing family planning at specified points in time are given in Table IV.A.2. The curves in Figure IV.A.2 also show the trends in continuing user rates in the four experimental groups. The initial use

rates were between 7 and 13 percent. The curves in the case of FP+WS+CC and FP+WS groups have displayed a more or less linear growth while that in FP+CC tended to plateau. The FP-Ed. curve had an initial rapid increase which had begun to flatten in its second year following the slope of other curves.

4. Effectively Protected Users of Family Planning

While the growth pattern of the continuing user rate can be used to evaluate the impact of the program, it is also important to be more specific in relation to which of the contraceptive methods are included in these rates. The demographic impact obviously depends on the effectiveness of the methods used. It is necessary to note particularly the proportionate use of condoms because of their low use-effectiveness. Therefore, the fact that the condom rate for the FP-Ed. group was about 50 percent (as seen in Table on page IV.A.8) means that the expectations for eventual impact will have to be somewhat reduced.

In order to demonstrate the influence of use-effectiveness in estimating the actual impact of the family planning program, a correction factor was applied to the continuing-use rates based on the relative effectiveness of each method used*. Essentially, this yielded a rate reflecting the hypothetical proportion of married women at risk of pregnancy who were completely protected from becoming pregnant at that point in time.

Figure IV.A.3 and the third section of Table IV.A.2 present the continuing use rates corrected for method effectiveness. These corrections lowered the use rates approximately 10-20% near the start of the project and up to 25-35% by the end. The curves therefore are not only lower in

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* In Table IV.C.1 the pregnancies occurring per 100 women years of use of each type of method are given. The mean pregnancy rate for all experimental groups was divided by the mean pregnancy rate in the non-contracepting population of all experimental groups and subtracted from one to yield the proportion of pregnancies averted by use of each method. This proportion was then applied to the actual users of each method in each experimental group to get the number of effectively protected users. The latter for each method were then summed to derive the total effective users in each experimental

(continued)

Figure IV.A.3 as compared to Figure IV.A.2, but somewhat flatter. All the experimental groups, however, show a very similar upward slope, and the plateauing noted in the continuing-user rates in the FP+CC group is not present in the effective-use curves. Effects of the correction varied between the experimental groups with FP-Ed. being reduced the most, reflecting the large volume of condom users in that group. The FP+WS group was the least affected since it had the smallest proportionate use of condoms and pills, the two least effective methods in this study. One might hypothesize that the intensive emphasis on women's services in this group of villages led to a concentration on the more effective women-related methods.

5. Age, Parity, and Pregnancy Order of Family Planning Acceptors

The 1970-71 distribution by age, parity and order of pregnancy of women who became acceptors of family planning at any time during the study period was obtained from the pregnancy history survey (Tables IV.A.3 - IV.A.6). Similar data were summarized for all women in the study villages in Section II (Tables II.B.5 - II.B.8). Comparison of the distributions in these two sets of tables shows a consistent tendency for the family planning acceptors during the study to come from among women who had attained a given pregnancy order or parity at a younger age. Stated in terms of Tables IV.A.3 and IV.A.4, family planning acceptors of a given age group had had a greater number of pregnancies or live births when compared to all married women of the same age group in the study villages. These patterns were similar across all experimental groups in which family planning services were provided.

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group at each point in time under consideration. For example: in Table IV.C.1 the mean pregnancy rate of all condom users was 26.8 per 100 women years of use. The rate for all non-contraceptors was 40.7. Thus $1 - \left(\frac{26.8}{40.7}\right) = .342$ is the proportion of pregnancies that theoretically would have been averted if the non-contraceptors had all used condoms in a manner similar to the actual condom users. Stated in another way, the use of condoms in this study was only 34.2 percent effective in preventing the occurrence of unwanted pregnancies.

6. Use of Family Planning Methods

During the program the methods offered to couples were: condoms, oral pills, IUD's, injectable Depo-Provera, vasectomy and tubectomy. To our knowledge, no couple used more than one method at any one time. Many couples, however, switched from one family planning method to another or went back to the same method after stopping for a while. Their records then showed more than one episode (time segment) of use during the period of program operation. The distribution of couples by number of use-episodes is shown in Table IV.A.1. Resident couples, on the average, had 2.2 use-episodes as compared to 1.4 for non-residents. Among residents the average number of use-episodes per couple varied slightly from one experimental group to another, and the pattern that emerges is that the longer a group had been provided with family planning services the higher the mean number of use-episodes. In the resident study population about 33 and 10 percent had a second and third use-episode respectively, but only 2 percent had four or more use-episodes.

The rest of this discussion will deal only with family planning users who were resident couples.

7. Popularity of Different Methods

Popularity of family planning methods varied between service groups and with time in the same group. From Table IV.A.7, it is clear that before the family planning services were offered by the project, sterilization was the most common method of fertility control in all the service groups. After introduction of family planning services, condom gradually became the most popular method. In fact, almost half the couples who were using contraceptive methods in FP-Ed. were condom-users towards the end of the program period. Oral pills were the least popular of the methods in all the groups. By 1974 IUD's were most used in FP+WS, moderately in FP+WS+CC, and FP-Ed. and relatively little used in FP+CC. Injectable Depo-Provera very quickly became established as a highly acceptable method and its use stablized at about 20% of the couples using contraception except for FP+WS+CC where it was used by 30 percent.

Transition Between Methods

Each use-epidsode could be terminated in one of three ways: the couple might change to another method, they might discontinue family planning completely, or they might continue the same method until the end of the study period. The termination status of the first segment of use is given in Table IV.A.8 by method for each of the experimental groups.

When condoms were the first method used, overall proportions of discontinuation, change to another method, and continuation until the end of the study were respectively 29, 37 and 33 percent. These more or less equal proportions are not found in individual experimental groups, however. Complete discontinuation of the use of the condom in the case of FP+WS+CC, FP+WS, and FP-Ed. was around 25 percent while it was 43 percent for FP+CC. Conversely, continuation until the end was the lowest in FP+CC. It was highest in FP-Ed. but this does not mean much because of the much shorter overall period of service and observation.

The proportion of condom-use during the first use-episode needs to be specially noted because of the lower contraceptive effectiveness balanced by its easy acceptability. The results can be roughly summarized as follows: there was high continuation and equal proportions of discontinuation and change in the FP-Ed. group; equal continuation and discontinuation with a high proportion of change in FP+WS; equal continuation and change with low discontinuation in FP+WS+CC; and very low continuation and high discontinuation with a moderate proportion changing in FP+CC.

We were surprised by the low acceptability of oral pills. The proportion who continued until the end of the study period was very low in all experimental groups. In the FP-Ed. group there was not enough time to get over a wide general distrust of the method and the total number of pill-users was only nine. In all groups, however, the proportions of women who changed to another method after first trying the pill was over 60 percent.

We were particularly struck by the sharp regional differences in attitudes to IUD's. The maximum number of IUD users was in the FP+WS group followed by FP+WS+CC. This method was obviously least popular in the FP+CC group. In the FP-Ed. group, over 60 percent of those who used IUD's switched to another method.

The use of injectable Depo-Provera was most consistent in FP+WS+CC and FP+WS groups. In both these experimental groups the complete discontinuation rate was between 20 and 25 percent and the proportion who continued until the end was about 35 percent. Those who changed to another method were about 40 percent. The complete discontinuation was the highest in FP+CC and in the FP-Ed. group the method was never really widely established.

Among ever-users of family planning the highest proportion of sterilization was observed in the FP+CC group followed by FP+WS and the FP-Ed. groups. Much of the credit for this goes to the government services which had been particularly active in these areas and provided financial incentives. The lowest proportion, around 10 percent, was observed in FP+WS+CC group which had been relatively untouched by the government services.

In the total study area, the first acceptance figures showed that condom was clearly the most popular method of family planning. This indicates its importance as a method which could lead to later transition to a more effective method. Injectable Depo-Provera, sterilization, IUD and pill followed in that order of acceptability after condom. The response to Depo-Provera is of some interest because it reflects the findings of our initial attitudes survey in the desire that was expressed for an injection method of family planning.

9. Reasons for Discontinuation of Methods

After using a method for the first time some women discontinued family planning completely and others changed to another method. At the time of each transition, careful questioning probed for the most important reasons for discontinuing or changing from the original method. These results are presented for each of the experimental groups in Table IV.A.9 for condoms; Table IV.A.10 for oral pills; Table IV.A.11 for IUD's; and in Table IV.A.12 for injectable Depo-Provera.

Among those who discontinued the use of condoms, the most important reason was accidental pregnancy. In the total study area accidental pregnancy was mentioned by 35 percent of those who discontinued. The corresponding percentages are 22 (FP+WS+CC), 27 (FP+WS), 46 (FP+CC) and 37 (FP-Ed.).

Wanting to have a baby was another specific reason mentioned for discontinuation of condoms. In the total of all the groups this reason was mentioned by 15 percent of those who dropped the method. The percentages of dropouts due to wanting to have a baby were 22 percent for FP+WS+CC, 19 percent for FP+WS, 7 percent for FP+CC and 19 percent for FP-Ed.

Oral pills were the least used method in the study area. As discussed earlier, of those who chose to use pills, over 60 percent changed to another method. Thirty-two couples discontinued family planning after their first experience with the pill. About 13 percent discontinued on account of accidental pregnancy, 16 percent in order to have a baby, 9 percent because it was bothersome to take a pill every day, and 16 percent because of heavy bleeding caused by its use. The distribution of reasons by groups is presented in Table IV.A.10.

Only 15 percent (33 couples) of the couples who started family planning with IUD's as their first method discontinued family planning completely. Wanting to have a baby, expulsion, backache and bleeding were the only specific reasons mentioned for discontinuation and the percentages of couples reporting these four reasons were 9, 24, 3 and 25 respectively.

Among users of injectable Depo-Provera, health complications caused by its use were the most common reasons for discontinuation. Heavy or irregular bleeding accounted for 25 percent of the discontinuation, and amenorrhea accounted for 12 percent.

10. Changes Between Methods

Of considerable interest in overall program planning for family planning are patterns of shifting between methods as distinct from the total discontinuance of any method. Distribution of couples who either discontinued or changed the method by specific method they changed to is presented in Tables IV.A.13, IV.A.14 and IV.A.15. These distributions are given for all villages combined rather than specific experimental group.

In the entire experimental area, 38 percent of the changes after the first method used, 32 percent after the second, and 33 percent after the third method involved discontinuation of contraception for the remainder

of the study. Couples who restarted using the same method after a break in contraceptive use were 17 percent after the first segment of use, 13 percent after the second segment, and 9 percent after the third segment of use of contraception.

After the first segment of contraceptive-use, if couples chose a method other than the one they were using, the choice was mostly condoms followed by injectable Depo-Provera, which parallels the overall high acceptability of these methods. Since IUD, pills and sterilization continued to have relatively low acceptability, there is no confirmation of the hoped for pattern that the changes would be in favor of a more effective method. The general patterns in the change of method remained the same after the second and the third segment of contraceptive use.

11. Continuity of Use of Different Methods

Comparative performance in terms of continuation of use of condom, pill, IUD's and injectable Depo-Provera are presented in Tables IV.A.16 - IV.A.19. The computations in these tables were based on the first segments of use and present the cumulative rate in life table terms by six month periods. The continuation rates were better in general for the FP+WS+CC and FP-Ed. groups than for the FP+WS group. The rates were poor for all methods in the FP+CC group in comparison with the other groups.

Despite group differences, general continuation rates showed that IUD's followed by injectable Depo-Provera seemed to have done better than other methods with 60 percent and 40 percent continuing on the method at two years. Obviously, pills were the least preferred method, having been discontinued by 93 percent at the end of two years. Of condoms users 30 percent were still using the method two years after starting.

12. Rates of Discontinuation Due to Specific Reasons

Net rates of discontinuation due to specific reasons are given in Tables IV.A.20 through IV.A.23 for the four methods under consideration. Again calculations of rates are cumulative for six month periods.

For condoms, the occurrence of unplanned pregnancy was consistently the most significant reason throughout two years of observation. The statement that discontinuation was because of need for a more reliable methods was, however, less than 4 percent at six months of use and below 6 percent at twelve months of use. Apart from failure, dissatisfaction with the method seemed to be very low.

As expected, discontinuation rates due to unplanned pregnancy were considerably lower for pills than for condoms but they were very high by international standards, probably indicating improper or irregular use. The rate for planned pregnancy was substantially higher especially at twenty-four months indicating the expected use by younger couples for spacing. The unpopularity of the pill seems directly related to dissatisfaction because it was difficult to remember to take the pill every day and also concerns about complications, especially bleeding which resulted from taking the pill.

Discontinuation rates due to planned and unplanned pregnancy were very low for IUD's as compared to condoms and pills. IUD expulsions and bleeding were given as the most important reasons for discontinuing IUD's.

Rates of discontinuation due to planned and unplanned pregnancy for injectable Depo-Provera were the lowest of all methods. This has to be placed in the perspective, however, of these being older women who were presumably less fertile than those using some of the other methods. Discontinuation was mainly on account of complications, the most significant one being irregular or heavy bleeding.

Table IV.A.1

DISTRIBUTION OF RESIDENT AND NON-RESIDENT COUPLES BY NUMBER OF CONTRACEPTIVE USE-EPISODES IN EACH EXPERIMENTAL GROUP

No. of Use-Episodes	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL	PERCENT
			Resident Couples			
1	486	448	348	330	1612	66.6
2	190	117	109	96	572	23.6
3	69	50	37	27	183	7.6
4+	17	13	16	7	53	2.2
Mean	2.4	2.3	2.1	1.9	2.2	
			Non-Resident Couples			
1	84	149	38	20	291	83.1
2	16	29	4	4	53	15.1
3	3	2	0	1	6	1.7
4+	0	0	0	0	0	0.0
Mean	1.5	1.4	1.2	1.6	1.4	
			Percent Non-Resident			
	13.5	26.2	8.2	5.4	14.5	

Table IV.A.2

PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE EVER-USERS, CONTINUING-USERS AND EFFECTIVE-USERS AT SPECIFIED POINTS IN TIME, BY EXPERIMENTAL GROUP

Year & Month		EVER-USE RATE				CONTINUING-USE RATE				EFFECTIVE-USE RATE			
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	FP+WS+CC	FP+WS	FP+CC	FP-Ed.
1969	Mar.	10.1	11.2			9.9	10.7			8.4	9.3		
	June	12.2	13.9			11.3	12.9			9.5	11.4		
	Sept.	15.6*	15.7*			13.7*	13.5*			11.2*	11.5*		
	Dec.	14.3	18.9			12.1	15.9			9.8	13.2		
1970	Mar.	17.3	22.9			13.9	19.7			11.1	15.8		
	June	20.5	24.8	8.1		16.3	20.4	8.0		12.3	16.0	7.6	
	Sept.	23.7	26.7	8.1		17.9	21.0	7.9		13.5	16.4	7.5	
	Dec.	25.2	28.2	8.6*		17.8	22.3	8.4*		13.3	17.3	7.7*	
1971	Mar.	28.5	30.0	14.4		19.2	23.3	14.0		14.3	18.1	11.7	
	June	31.5	33.1	18.6		21.6	25.2	17.3		15.4	19.4	13.6	
	Sept.	33.6	34.0	23.3		22.6	24.2	21.1		16.2	18.6	15.6	
	Dec.	35.5	36.5	27.3	6.8	22.7	24.4	23.6	6.7	16.3	18.8	16.4	6.1
1972	Mar.	37.8	38.5	30.4	7.2	23.8	26.4	23.1	7.2	17.1	20.3	15.1	6.6
	June	39.6	40.8	32.2	7.5*	23.9	28.7	24.2	7.3*	17.1	21.6	15.7	6.7*
	Sept.	41.1	43.7	36.0	16.2	25.0	31.6	27.3	15.5	17.7	23.6	18.2	10.7
	Dec.	42.8	46.1	38.5	19.5	26.2	33.8	28.0	17.8	18.4	25.0	19.0	12.3
1973	Mar.	45.1	48.2	40.9	25.7	28.0	35.5	27.2	21.1	19.5	26.1	18.9	14.4
	June	46.1	49.5	42.0	30.6	28.9	36.5	25.6	24.2	20.5	27.3	17.8	16.1
	Sept.	47.5	51.3	43.1	32.6	29.5	37.8	26.6	25.1	20.8	28.3	18.8	16.6
	Dec.	49.1	52.1	45.0	34.4	31.7	37.6	27.0	26.5	22.2	28.2	19.4	17.4
1974	Mar.	50.7	54.2	46.2	37.0	34.2	40.9	28.2	29.8	23.8	30.8	20.6	19.5

*Date full scale family planning services effective.
Dotted lines link rates in the different experimental groups at equivalent points in time following the start of family planning services.

Table IV.A.3

MEAN PARITY FOR EACH 5-YEAR AGE GROUP OF WOMEN
BY EXPERIMENTAL GROUP AS OF 1970-1971
(Family Planning Acceptors)

AGE GROUP	EXPERIMENTAL GROUP				TOTAL
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	
15-19	0.667	1.053	1.267	1.091	1.000
20-24	1.579	1.803	1.500	1.841	1.674
25-29	3.333	3.350	3.095	3.470	3.315
30-34	4.758	5.189	5.145	4.981	5.024
35-39	6.027	6.093	5.346	5.184	5.734
40-44	6.929	6.469	6.517	6.545	6.602
45-49	7.500	7.333	6.167	7.625	7.207
50+	10.000	7.000	-	5.000	6.800
TOTAL	4.020	4.174	3.876	4.326	4.099

Table IV.A.4

MEAN NUMBER OF PREGNANCIES FOR EACH 5-YEAR AGE GROUP OF WOMEN BY EXPERIMENTAL GROUP AS OF 1970-1971
(Family Planning Acceptors)

AGE GROUP	EXPERIMENTAL GROUP				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
15-19	0.778	1.053	1.333	1.273	1.079
20-24	1.985	1.985	1.720	1.932	1.890
25-29	3.590	3.517	3.270	3.621	3.506
30-34	5.136	5.378	5.387	5.212	5.283
35-39	6.351	6.256	5.808	5.367	6.005
40-44	7.214	6.781	7.000	6.750	6.910
45-49	7.833	7.556	6.333	7.750	7.414
50+	10.000	7.000	-	5.000	6.800
TOTAL	4.324	4.354	4.135	4.496	4.329

Table IV.A.5

MEAN AGE OF WOMEN BY PARITY
AND EXPERIMENTAL GROUP AS OF 1970-1971
(Family Planning Acceptors)

	EXPERIMENTAL GROUP				
PARITY	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
0	19.983	19.538	23.574	17.983	19.340
1	21.991	22.931	22.185	23.100	22.519
2	24.509	24.052	25.248	25.711	24.820
3	28.345	28.672	28.408	28.795	28.547
4	31.743	30.910	30.362	32.224	31.339
5	34.654	33.436	33.035	34.612	34.015
6	35.011	35.831	34.390	34.542	34.959
7	36.793	36.253	35.694	39.824	36.921
8	39.708	39.262	38.554	37.400	38.782
9	38.794	40.070	38.792	38.385	39.083
10	40.500	41.854	42.833	41.125	41.254
11	34.917	-	-	-	34.917
13	42.208	-	-	-	42.208
TOTAL	30.473	30.581	29.800	31.231	30.509

Table IV.A.6

MEAN AGE OF WOMEN FOR EACH ORDER OF PREGNANCY
BY EXPERIMENTAL GROUP AS OF 1970-1971
(Family Planning Acceptors)

ORDER OF PREGNANCY	EXPERIMENTAL GROUP				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
0	19.181	19.083	21.583	17.983	18.197
1	21.862	22.852	22.212	23.000	22.410
2	23.889	23.415	24.922	24.861	24.201
3	28.437	28.395	27.215	28.609	28.206
4	29.638	30.738	29.223	31.663	30.325
5	34.126	33.200	33.348	34.556	33.862
6	34.045	34.250	33.252	34.036	33.898
7	36.048	37.185	36.587	39.368	37.083
8	38.563	38.069	36.942	37.167	37.782
9	38.778	40.161	39.288	38.257	39.157
10	40.853	40.607	40.083	41.400	40.862
11	34.917	-	42.833	40.667	40.431
13	42.208	-	-	-	42.208
TOTAL	30.473	30.561	29.765	31.231	30.512

Table IV.A.7

PERCENTAGE DISTRIBUTION OF CURRENT USERS OF FAMILY PLANNING BY METHOD CURRENTLY BEING USED AS ON MARCH 31 OF EACH CALENDAR YEAR BY EXPERIMENTAL GROUP

METHOD CURRENTLY USED	FP+WS+CC					FP+WS					FP+CC					FP-Ed.				
	1970	1971	1972	1973	1974	1970	1971	1972	1973	1974	1970	1971	1972	1973	1974	1970	1971	1972	1973	1974
Condom	18.0	25.4	33.0	35.3	34.8	20.6	25.7	24.5	31.8	28.7	0.0	18.1	43.2*	37.5*	30.7*	5.5	7.1	6.6	41.9	47.7
Pill	3.8	5.4	2.6	4.8	5.5	1.9	1.6	2.8	1.0	0.9	0.0	1.9	5.7	4.9	4.7	0.0	0.0	0.0	1.1	0.4
IUD	18.8	16.8	14.6	9.2	8.2	13.5	16.0	21.3	25.7	25.1	0.0	0.0	0.6	1.0	3.3	18.2	17.9	16.4	10.6	7.0
Inj.Depo-Provera	30.8	27.0	27.0	27.2	29.9	27.7	20.3	17.6	12.7	20.0	0.0	22.9	13.6	14.6	19.8	1.8	1.8	3.3	12.8	19.4
Vasectomy	9.8	7.6	6.9	8.1	6.7	25.2	21.9	19.9	15.8	13.7	58.6	31.4	19.9	24.9	23.6	32.7	32.1	32.8	17.9	12.8
Tubectomy	18.8	17.8	15.9	15.4	14.9	11.0	14.4	13.9	13.1	11.6	41.4	25.7	17.0	17.1	17.9	41.8	41.1	41.0	15.6	12.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Current Users as of Date Specified	133	185	233	272	328	155	187	216	292	335	58	105	176	205	212	55	56	61	179	258

*Includes one user of diaphragm and cream.

Table IV.A.8

DISTRIBUTION OF COUPLES BY METHOD USED AND TERMINATION STATUS OF FIRST EPISODE BY EXPERIMENTAL GROUP

METHOD USED DURING FIRST EPISODE		TERMINATION STATUS OF FIRST EPISODE																			
		FP+WS+CC				FP+WS				FP+CC				FP-Ed.				ALL GROUPS			
		Disc	Chng	Cont	Total	Disc	Chng	Cont	Total	Disc	Chng	Cont	Total	Disc	Chng	Cont	Total	Disc	Chng	Cont	Total
Condom	N	50	71	78	199	48	89	54	191	78	68	35	181	43	49	81	173	219	277	248	744
	Row %	25.1	35.7	39.2	100.0	25.1	46.6	28.3	100.0	43.1	37.6	19.3	100.0	24.9	28.3	46.8	100.0	29.4	37.2	33.3	100.0
	Col. %	(47.2)	(37.4)	(41.0)	(41.0)	(60.8)	(50.3)	(28.1)	(42.6)	(74.3)	(62.4)	(26.1)	(52.0)	(69.3)	(51.0)	(47.1)	(52.4)	(62.2)	(48.4)	(36.0)	(46.1)
Pill	N	17	34	6	57	4	15	1	20	5	16	4	25	6	3	—	9	32	68	11	111
	Row %	29.8	59.6	10.5	100.0	20.0	75.0	5.0	100.0	20.0	64.0	16.0	100.0	66.7	33.3		100.0	28.8	61.3	9.9	100.0
	Col. %	(16.0)	(17.9)	(3.2)	(11.7)	(5.1)	(8.5)	(0.5)	(4.5)	(4.8)	(14.7)	(3.0)	(7.2)	(9.7)	(3.1)		(2.7)	(9.1)	(11.9)	(1.6)	(6.9)
IUD	N	15	40	15	70	6	38	46	90	4	5	1	10	8	33	11	52	33	116	75	222
	Row %	21.4	57.1	21.4	100.0	6.7	42.2	51.1	100.0	40.0	50.0	10.0	100.0	15.4	63.5	21.2	100.0	14.9	52.3	32.9	100.0
	Col. %	(14.2)	(21.0)	(7.9)	(14.4)	(7.6)	(21.4)	(24.0)	(20.1)	(3.8)	(4.6)	(0.7)	(2.9)	(12.9)	(34.4)	(6.4)	(15.8)	(9.4)	(20.3)	(10.6)	(13.8)
Inj.D-P	N	24	45	43	112	21	35	29	85	18	30	23	61	5	8	21	34	68	108	116	292
	Row %	21.4	40.2	38.4	100.0	24.7	41.2	34.1	100.0	29.5	32.8	37.7	100.0	14.7	23.5	61.8	100.0	23.3	37.0	39.7	100.0
	Col. %	(22.6)	(23.7)	(22.6)	(23.0)	(26.5)	(19.8)	(15.1)	(19.0)	(17.1)	(18.3)	(17.2)	(17.5)	(8.1)	(8.3)	(12.2)	(10.3)	(19.3)	(18.9)	(16.5)	(18.1)
Vasectomy	N	—	—	15	15	—	—	41	41	—	—	39	39	—	2	28	30	—	2	123	125
	Row %			100.0	100.0			100.0	100.0			100.0	100.0		6.7	93.3	100.0		1.6	98.4	100.0
	Col. %			(7.9)	(3.1)			(21.4)	(9.1)			(29.1)	(11.2)		(2.1)	(16.3)	(9.1)		(0.3)	(17.9)	(7.7)
Tubectomy	N	—	—	33	33	—	—	21	21	—	—	32	32	—	—	31	31	—	—	117	117
	Row %			100.0	100.0			100.0	100.0			100.0	100.0			100.0	100.0			100.0	100.0
	Col. %			(17.4)	(6.8)			(10.9)	(4.7)			(23.9)	(9.2)			(18.0)	(9.4)			(17.0)	(7.3)
Others	N	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	1	—	1
	Row %														100.0		100.0		100.0		100.0
	Col. %														(1.1)		(0.3)		(0.2)		(0.1)
TOTAL	N	106	190	190	486	79	177	192	448	105	109	134	348	62	96	172	330	352	572	688	1612
	Row %	21.8	39.1	39.1	100.0	17.6	39.5	42.9	100.0	30.2	31.3	38.5	100.0	18.8	29.1	52.1	100.0	21.8	35.5	42.7	100.0
	Col. %	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Disc. = Discontinuation, Chng. = Change to another method, Cont. = Continuing user to the end of the study.

Table IV.A.9

PERCENTAGE DISTRIBUTION OF WOMEN BY REASON FOR DISCONTINUATION OR CHANGE FROM USE OF CONDOM IN THE FIRST EPISODE BY EXPERIMENTAL GROUP

REASON	Discont.(D) Change(C) Total(T)	PERCENTAGE OF ALL REASONS				
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
Unplanned Pregnancy 1	D	22	27	46	37	35
	C	44	28	38	27	34
	T	35	28	42	31	34
Planned Pregnancy 2	D	22	19	7	19	15
	C	7	16	4	4	9
	T	13	17	6	11	12
Wanted More Reliable or Permanent Method 3	D	0	2	1	2	1
	C	21	13	15	16	16
	T	12	9	7	10	9
Husband Away and Hence No Need 4	D	6	6	6	2	6
	C	1	1	4	4	2
	T	3	3	6	3	4
Couple Moved Out 5	D	18	2	5	5	7
	C	3	1	3	0	2
	T	9	1	4	2	4
Did Not Like Method 6	D	4	0	3	2	2
	C	0	0	2	2	1
	T	2	0	2	2	1
Spouse Did Not Like 7	D	0	4	6	2	4
	C	0	2	3	12	4
	T	0	3	5	8	4
Other Reasons	D	18	29	21	12	20
	C	7	11	15	8	10
	T	12	17	18	10	15
Reason Not Known	D	10	11	5	19	10
	C	17	28	16	27	22
	T	14	22	10	23	17
ALL REASONS	D	100 (78)	100 (50)	100 (48)	100 (43)	100 (219)
	C	100 (68)	100 (71)	100 (89)	100 (49)	100 (277)
	T	100 (146)	100 (121)	100 (137)	100 (92)	100 (496)

(N in parentheses)

Table IV.A.10

PERCENTAGE DISTRIBUTION OF WOMEN BY REASON FOR DISCONTINUATION OR CHANGE FROM USE OF ORAL PILLS IN THE FIRST EPISODE BY EXPERIMENTAL GROUP

REASON	Discont.(D) Change(C) Total(T)	PERCENTAGE OF ALL REASONS				
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
Unplanned Pregnancy 1	D	18	0	20	0	13
	C	15	13	19	0	15
	T	16	11	19	0	14
Planned Pregnancy 2	D	23	25	0	0	16
	C	6	20	6	0	9
	T	12	21	5	0	11
Husband Away and Hence No Need 4	D	0	25	0	0	3
	C	3	13	13	0	7
	T	2	16	10	0	6
Moved Out of Village 5	D	6	0	20	0	6
	C	12	0	6	0	7
	T	10	0	9	0	7
Difficult to Take Pill Every Day 33	D	12	0	20	0	9
	C	9	0	13	0	7
	T	10	0	14	0	8
Heavy Bleeding 34, 43	D	6	25	0	50	16
	C	12	20	6	0	12
	T	10	21	5	33	13
Other Reasons	D	29	25	20	50	31
	C	23	27	31	33	27
	T	25	26	29	45	28
Reason Not Known	D	6	0	20	0	6
	C	20	7	6	67	16
	T	15	5	9	22	13
All Reasons	D	100 (17)	100 (4)	100 (5)	100 (6)	100 (32)
	C	100 (34)	100 (15)	100 (16)	100 (3)	100 (68)
	T	100 (51)	100 (19)	100 (21)	100 (9)	100 (100)

(N in parentheses)

Table IV.A.11

PERCENTAGE DISTRIBUTION OF WOMEN BY REASON FOR DISCONTINUATION OR CHANGE FROM USE OF IUD IN THE FIRST EPISODE BY EXPERIMENTAL GROUP

REASON	Discont.(D) Change(C) Total(T)	PERCENTAGE OF ALL REASONS				
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
Unplanned Pregnancy 1	D	0	0	0	0	0
	C	7	5	0	3	5
	T	5	5	0	2	4
Planned Pregnancy 2	D	0	33	0	13	9
	C	7	5	0	0	4
	T	5	9	0	2	5
Wanted More Reliable or Permanent Method 3	D	0	0	0	0	0
	C	5	8	0	0	4
	T	4	7	0	0	3
Husband Away and Hence No Need 4	D	0	0	0	0	0
	C	0	3	0	0	1
	T	0	2	0	0	1
Loop Expelled 41	D	40	33	0	0	24
	C	43	18	40	18	28
	T	42	20	22	15	27
Caused Backache 42	D	0	0	25	0	3
	C	0	3	40	3	3
	T	0	2	34	3	3
Caused Bleeding 43	D	13	17	0	62	25
	C	23	21	20	24	23
	T	20	21	11	32	23
Other Reasons	D	20	17	50	0	18
	C	10	18	0	15	14
	T	13	18	22	12	15
Reason Not Known	D	27	0	25	25	21
	C	5	19	0	37	18
	T	11	16	11	34	19
All Reasons	D	100 (15)	100 (6)	100 (4)	100 (8)	100 (33)
	C	100 (40)	100 (38)	100 (5)	100 (33)	100 (116)
	T	100 (55)	100 (44)	100 (9)	100 (41)	100 (149)

(N in parentheses)

Table IV.A.12

PERCENTAGE DISTRIBUTION OF WOMEN BY REASON FOR DISCONTINUATION OR CHANGE FROM USE OF INJECTABLE DEPO-PROVERA IN THE FIRST EPISODE BY EXPERIMENTAL GROUP

REASON	Discont.(D) Change(C) Total(T)	PERCENTAGE OF ALL REASONS				
		FP+WS+CC	FP+WS	FP+CC	FP-Ed.	TOTAL
Unplanned Pregnancy 1	D	0	5	0	0	2
	C	7	3	5	0	5
	T	4	3	3	0	3
Planned Pregnancy 2	D	4	0	5	20	3
	C	11	3	0	0	5
	T	9	2	0	8	5
Wanted More Reliable or Permanent Method 3	D	0	0	0	0	0
	C	0	14	25	13	10
	T	0	9	13	8	6
Moved Out of Village 5	D	9	9	0	0	6
	C	4	0	0	0	2
	T	6	3	0	0	3
Caused Heavy or Irregular Bleeding 51	D	21	24	39	0	25
	C	31	26	30	38	30
	T	28	25	34	23	28
Caused Amenorrhea 52	D	4	19	11	20	12
	C	9	14	0	0	8
	T	7	16	5	8	10
Caused Hot Feeling 53	D	4	5	6	0	4
	C	7	0	5	12	5
	T	6	2	5	7	5
Other Reasons	D	54	24	39	60	41
	C	11	17	20	12	15
	T	26	20	29	31	25
Reason Not Known	D	4	14	5	0	7
	C	20	23	15	25	20
	T	14	20	11	15	15
All Reasons	D	100 (24)	100 (21)	100 (18)	100 (5)	100 (68)
	C	100 (45)	100 (35)	100 (20)	100 (8)	100 (108)
	T	100 (69)	100 (56)	100 (38)	100 (13)	100 (176)

(N in parentheses)

Table IV.A.13

DISTRIBUTION OF WOMEN WHO CHANGED FROM ONE METHOD TO ANOTHER
ALL EXPERIMENTAL GROUPS

1st Method Used		2nd Method Used								
		None	Condom	Pill	IUD	Inj. DP	Vasectomy	Tubectomy	Other	Total
Condom		219	108	33	55	64	11	5	1	496
	%	44.2	21.8	6.7	11.1	12.9	2.2	1.0	0.2	100.0
Pill		32	23	14	9	19	1	2	-	100
	%	32.0	23.0	14.0	9.0	19.0	1.0	2.0		100.0
IUD		33	40	15	7	40	6	8	-	149
	%	22.1	26.8	10.1	4.7	26.8	4.0	5.4		100.0
Inj.DP		68	37	9	10	25	8	19	-	176
	%	38.6	21.0	5.1	5.7	14.2	4.5	10.8		100.0
Vasectomy		-	1	-	-	-	-	1	-	2
	%		50.0					50.0		100.0
Tubectomy		-	-	-	-	-	-	-	-	-
	%									
Other		-	1	-	-	-	-	-	-	1
	%		100.0							100.0
TOTAL		352	210	71	81	148	26	35	1	924
	%	38.1	22.7	7.7	8.8	16.0	2.8	3.8	0.1	100.0

Table IV.A.14

DISTRIBUTION OF WOMEN WHO CHANGED FROM ONE METHOD TO ANOTHER
ALL EXPERIMENTAL GROUPS

2nd Method Used		3rd Method Used								
		None	Condom	Pill	IUD	Inj. DP	Vasectomy	Tubectomy	Other	Total
Condom		41	17	7	12	29	2	2	2	112
	%	36.6	15.2	6.3	10.7	25.9	1.8	1.8	1.8	100.0
Pill		16	20	4	5	12	1	1	-	59
	%	27.1	33.9	6.8	8.5	20.3	1.7	1.7		100.0
IUD		9	18	1	3	6	-	1	1	39
	%	23.1	46.2	2.6	7.7	15.4		2.6	2.6	100.0
Inj. DP		20	14	4	3	11	1	3	-	56
	%	35.7	25.0	7.1	5.4	19.6	1.8	5.4		100.0
Vasectomy		-	2	-	-	-	-	-	-	2
	%		100.0							100.0
Tubectomy		-	-	-	-	-	-	-	-	-
	%									
Other		-	-	-	1	-	-	-	-	1
	%				100.0					100.0
TOTAL		86	71	16	24	58	4	7	3	269
	%	32.0	26.4	5.9	8.9	21.6	1.5	2.6	1.1	100.0

Table IV.A.15

DISTRIBUTION OF WOMEN WHO CHANGED FROM ONE METHOD TO ANOTHER
ALL EXPERIMENTAL GROUPS

3rd Method Used		4th Method Used								
		None	Condom	Pill	IUD	Inj. DP	Vasectomy	Tubectomy	Other	Total
Condom		9	2	6	6	11	2	-	-	36
	%	25.0	5.6	16.7	16.7	30.6	5.6			100.0
Pill		2	4	1	-	2	-	-	-	9
	%	22.2	44.4	11.1		22.2				100.0
IUD		2	3	-	1	1	-	-	-	7
	%	28.6	42.9		14.2	14.2				100.0
Inj. DP		13	3	4	1	3	1	-	-	25
	%	52.0	12.0	16.0	4.0	12.0	4.0			100.0
Vasectomy		-	-	-	-	-	-	-	-	-
	%									
Tubectomy		-	-	-	-	-	-	-	-	-
	%									
Other		-	-	1	-	-	-	1	1	3
	%			33.3				33.3	33.3	100.0
TOTAL		26	12	12	8	17	3	1	1	80
	%	32.5	15.0	15.0	10.0	21.3	3.8	1.3	1.3	100.0

Table IV.A.16

LIFE TABLE RATES OF CUMULATIVE CONTINUATION OF FIRST SEGMENT
BY EXPERIMENTAL GROUP: CONDOM

MONTH	CONTINUATION RATE				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	ALL GROUPS
6	.7258	.7151	.6776	.6390	.6921
12	.5443	.4767	.3763	.5513	.4787
18	.4810	.3893	.2235	.4232	.3723
24	.4052	.2663	.1756	.4232	.2872

Table IV.A.17

LIFE TABLE RATES OF CUMULATIVE CONTINUATION OF FIRST SEGMENT BY EXPERIMENTAL GROUP: PILL

	CONTINUATION RATE				
MONTH	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	ALL GROUPS
6	.4401	.3500	.4456	*	.4036
12	.1291	.1500	.3342	*	.1890
18	.0861	.0500	.1300	*	.0912
24	.0430	.0500	.1300	*	.0684

*small number of cases

Table IV.A.18

LIFE TABLE RATES OF CUMULATIVE CONTINUATION OF FIRST SEGMENT BY EXPERIMENTAL GROUP: IUD

MONTH	CONTINUATION RATE				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	ALL GROUPS
6	.8038	.8547	*	*	.8360
12	.6833	.7691	*	*	.7258
18	.6431	.6762	*	*	.6636
24	.5594	.6057	*	*	.5839

*small number of cases

Table IV.A.19

LIFE TABLE RATES OF CUMULATIVE CONTINUATION OF FIRST SEGMENT BY EXPERIMENTAL GROUP: INJECTABLE DEPO-PROVERA

MONTH	CONTINUATION RATE				
	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	ALL GROUPS
6	.7403	.7622	.6411	.6175	.7135
12	.6160	.5583	.4457	.5165	.5511
18	.5268	.4552	.4037	.5165	.4716
24	.4389	.3942	.3585	.5165	.4040

Table IV.A.20

CUMULATIVE NET RATES OF DISCONTINUATION OF FIRST SEGMENT
DUE TO DIFFERENT REASONS: CONDOM
ALL EXPERIMENTAL GROUPS

REASON FOR DISCONTINUATION	MONTHS 6	12	18	24
Unplanned Pregnancy	.1155	.1986	.2441	.2765
Planned Pregnancy	.0273	.0603	.0761	.0893
Wanted More Reliable or Permanent Method	.0365	.0566	.0673	.0703
Husband Away, Hence No Need	.0158	.0283	.0283	.0310
Did Not Like Method	.0048	.0103	.0103	.0136
Spouse Did Not Like the Method	.0209	.0244	.0244	.0308
Other Reasons	.0420	.0819	.1042	.1221
Unspecified Reasons	.0451	.0610	.0730	.0792
TOTAL	.3079	.5214	.6277	.7128

Table IV.A.21

CUMULATIVE NET RATES OF DISCONTINUATION OF FIRST SEGMENT
DUE TO DIFFERENT REASONS: PILL
ALL EXPERIMENTAL GROUPS

REASON FOR DISCONTINUATION	MONTHS 6	12	18	24
Unplanned Pregnancy	.0867	.1122	.1122	.1122
Planned Pregnancy	.0348	.0970	.1266	.1494
Husband Away, Hence No Need	.0461	.0588	.0734	.0734
Difficult To Take Pill Everyday	.0770	.0905	.0905	.0905
Heavy Bleeding	.1094	.1216	.1216	.1216
Other Reasons	.1759	.2515	.2848	.2848
Unspecified Reasons	.0666	.0793	.0996	.0996
TOTAL	.5964	.8110	.9088	.9316

Table IV.A.22

CUMULATIVE NET RATES OF DISCONTINUATION OF FIRST SEGMENT
DUE TO DIFFERENT REASONS: IUD
ALL EXPERIMENTAL GROUPS

REASON FOR DISCONTINUATION	MONTHS 6	12	18	24
Unplanned Pregnancy	.0196	.0297	.0297	.0297
Planned Pregnancy	.0192	.0291	.0392	.0392
Wanted More Reliable or Permanent Method	.0098	.0098	.0202	.0202
Husband Away, Hence No Need	.0000	.0000	.0108	.0108
Loop Expelled	.0481	.0781	.0987	.1517
Caused Bleeding	.0479	.0880	.0880	.1010
Other Reasons	.0000	.0202	.0305	.0305
Unspecified Reasons	.0193	.0193	.0193	.0329
TOTAL	.1640	.2742	.3364	.4161

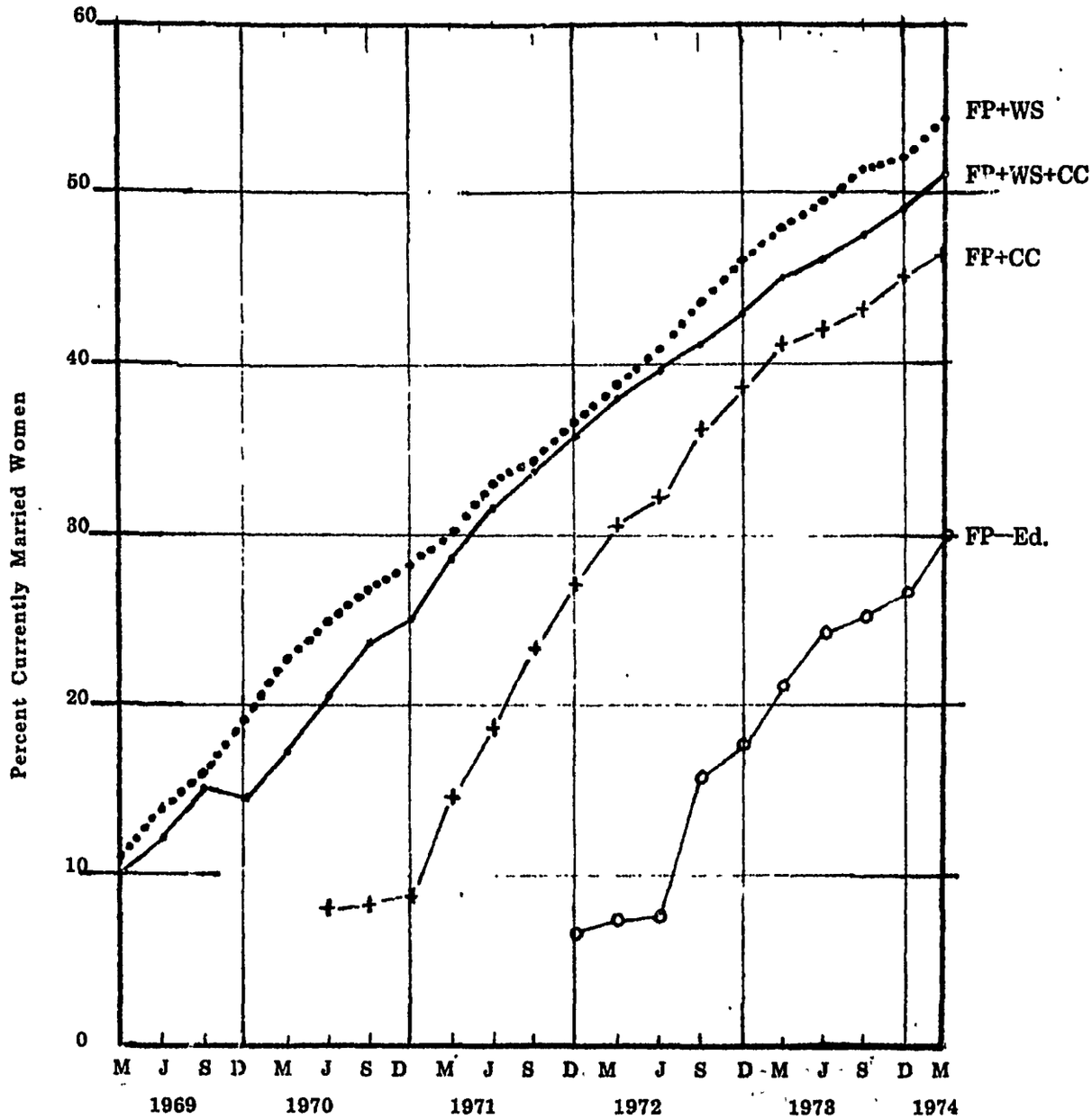
Table IV.A.23

CUMULATIVE NET RATES OF DISCONTINUATION OF FIRST SEGMENT
DUE TO DIFFERENT REASONS: INJECTABLE DEPO-PROVERA
ALL EXPERIMENTAL GROUPS

REASON FOR DISCONTINUATION	MONTHS 6	12	18	24
Unplanned Pregnancy	.0155	.0155	.0203	.0203
Planned Pregnancy	.0155	.0197	.0197	.0246
Wanted More Reliable or Permanent Method	.0189	.0312	.0312	.0414
Caused Heavy or Irregular Bleeding	.0915	.1287	.1661	.1813
Caused Amenorrhea	.0191	.0487	.0487	.0594
Caused Hot Feeling	.0115	.0199	.0199	.0251
Other Reasons	.0686	.1227	.1461	.1567
Unspecified Reasons	.0459	.0626	.0764	.0871
TOTAL	.2865	.4489	.5284	.5960

Figure IV.A.1

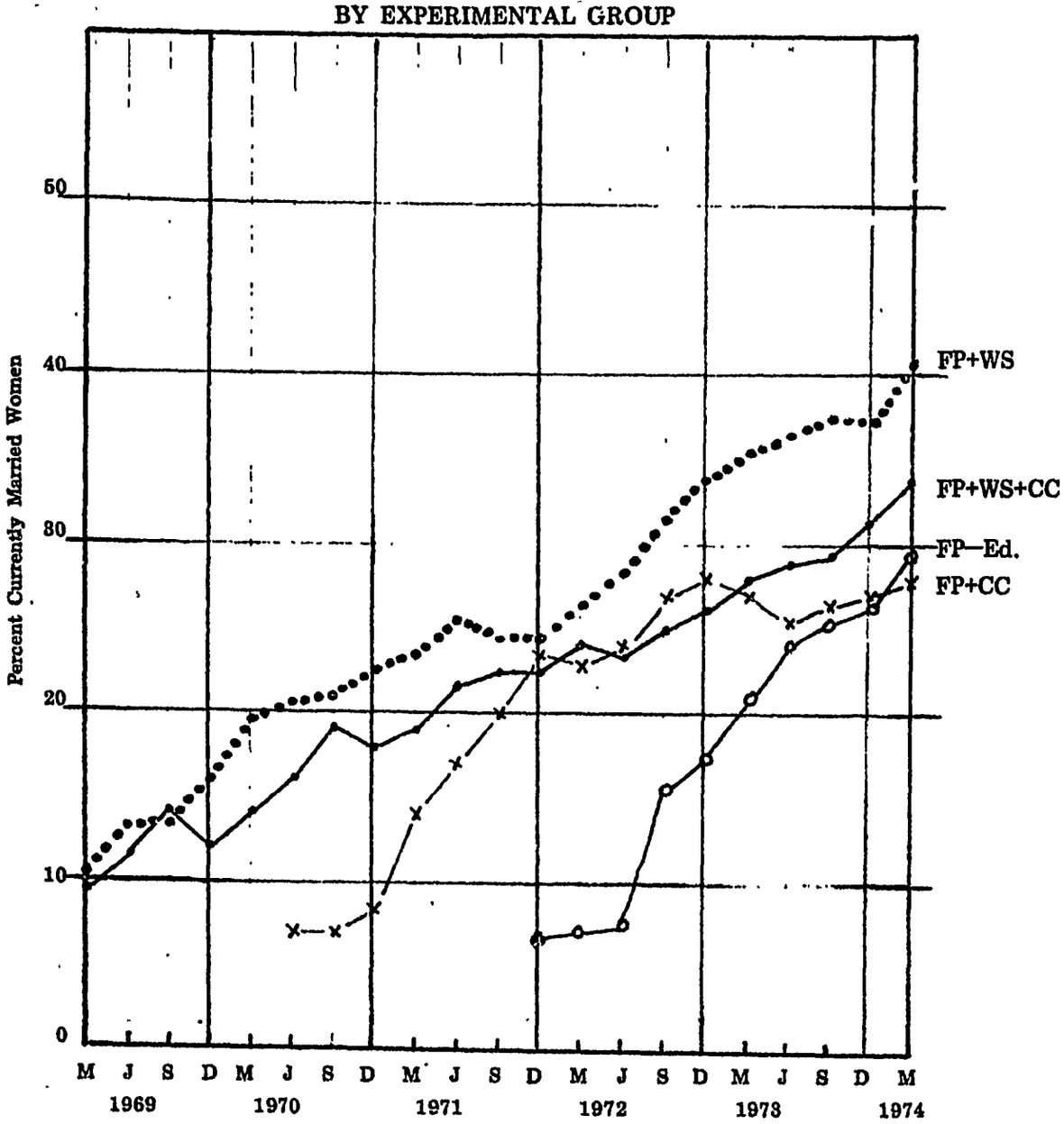
PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE EVER-USERS OF FAMILY PLANNING AT SPECIFIED POINTS IN TIME BY EXPERIMENTAL GROUP



M = March
J = June
S = September
D = December

Figure IV.A.2

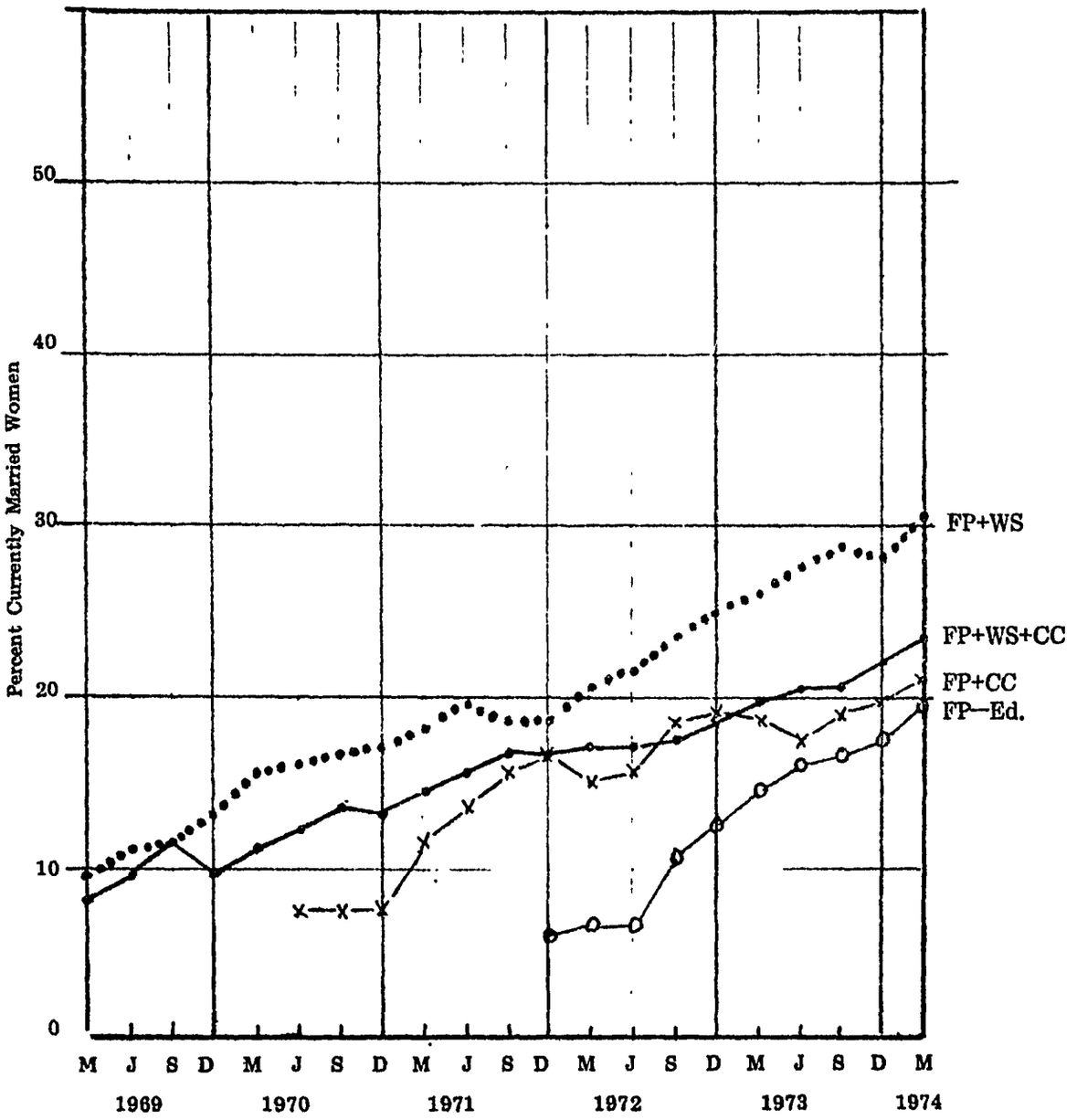
PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE CONTINUING USERS OF FAMILY PLANNING AT SPECIFIED POINTS IN TIME BY EXPERIMENTAL GROUP



M = March
J = June
S = September
D = December

Figure IV.A.3

PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE "EFFECTIVE-USERS" OF FAMILY PLANNING AT SPECIFIED POINTS IN TIME BY EXPERIMENTAL GROUP



M = March
J = June
S = September
D = December

B. ANALYSIS OF FERTILITY CHANGES

During the period of intensive data collection, 1969-73, 5644 births were recorded for the women in the twenty-six study villages. There was a marked seasonality in these births, with a peak in the four months of July to October, and a low in March and April.

Five measures were used to compare changes in fertility among the experimental groups during the project. To measure changes in level of fertility a crude birth rate (CBR), an age-adjusted general fertility rate (AGFR), and a total fertility rate (TFR) were calculated for each group by calendar year. To measure changes in age-parity patterns of fertility the median parity of current births was determined for each group for each calendar year. In addition, the percent of births in a given year which were to women under 20 years or over 40 years of age or were of parities greater than four, i.e., so-called "excess fertility" (USAID, 1970), was obtained.

Each of the service groups showed declines, and in some groups substantial declines, in levels of fertility over the period from 1969-70 to 1973. Each of the groups saw some reduction in median parity, and in excess fertility, although in some experimental groups the change in age-parity distribution was minimal. However, the interpretation of inter-group differentials in changes in fertility is made more difficult by the presence of a general secular decline in Punjabi fertility noted in Section II.B, and by several problems in the data collection process.

In this section we shall first review the difficulties inherent in the vital statistics data collection process, and discuss the adjustment procedures employed to compensate for these in the computation of vital rates, before presenting the measures of fertility change themselves or attempting an interpretation of inter-group differences.

1. Vital Statistics Data

A technical problem of considerable importance, previously referred to in the methodology section of this report, is the small size of the population of each experimental group. Because of the effort involved in trying to cover the various population groups with effective services and

with good quality data gathering, we made the difficult decision to reduce the size of each study group to the bare minimum of 5,000 population. As a result, our figures show much more fluctuation in fertility rates than desirable for definitive judgements, especially for groups where the study period was relatively short. It is difficult to resolve questions about whether some of the effects observed may have been due merely to chance fluctuation. Overall patterns become evident however in trend lines.

A further technical problem arises from the fact that the various procedures for collection of information on births were evolved during 1969, the first year of service in some villages. By 1970, the intensive effort to achieve complete registration of births was in full swing, and the data show considerable humping or aggregation of births in that year in most groups of villages. For several reasons we think that a major part of this effect was because some births from 1969 were actually reported in 1970. We have therefore averaged the rates for 1969 and 1970 to give a more accurate picture of the starting level of fertility in the study villages. We had thought that we might need to apply two-year moving averages to all of the figures, but we judge the data to have sufficient validity, despite some erratic fluctuation that averaging is necessary only for the start-up period, for all groups except the FP-Ed. group. For this group the 1969-71 data were gathered only on a retrospective basis, and a humping of the birth rate can be seen in 1972, the year in which services and longitudinal registration of vital events were started in this group of villages. This effect is analogous to that observed in the other groups in 1970. Therefore we have also averaged the years 1971 and 1972 for this group, and measure fertility changes both from 1969-70 and from 1971-72.

A second consideration in deciding to average 1969-70 data was that it seemed to be the most accurate way to cope with the problem of getting precise birth dates at the beginning of our registration system because of general difficulties that are inherent in balancing what we have called "outgoing" and "incoming" births. As explained in the introductory section, this part of the Punjab practices village exogamy. By custom, all women must marry outside of their own village. The birth registration problem is created because of the further custom that the bride goes home to her parents for the delivery of the first two or three children. Since she leaves her

husband's home two to three months before delivery and stays away three to four months after delivery, we faced the continuing problem that about one-third of the deliveries were of women not in our study population, while a similar proportion of our women were away five or six months around the time of delivery. Although continuous efforts were made during the entire study period to collect information on all births to residents in our villages and to differentiate between these births and births in the villages to non-resident women, this was particularly difficult at the start of the data collection in 1969.

There are also some important questions about the comparability of data across the groups. Data on births were obtained in a continuous fashion from the following three primary sources:

a. Chowkidar: The chowkidar is a village resident employed by the government as the only source of vital statistics under the official registration system. He has multiple responsibilities related to his title, "watchman," and is often illiterate. During the period of our study the chowkidar continued to record all births which took place in the study villages. These records, however, did not contain information on births to residents of the village which took place outside the village (i.e., the outgoing births).

b. Vital Statistics Investigator (VSI): The VSI was employed by the project to visit each village once in fifteen days and to contact about twelve key persons (informants) such as barber, shopkeeper, or village midwife, who informed him of births, both incoming and outgoing, which took place in the village and to villagers outside their village. The VSI then confirmed the information from members of the family. He was a college graduate, and covered two groups of villages or about 10,000 population, travelling by bicycle.

c. Family Health Worker: The FHW was employed by the project with primary responsibility for delivering health and family planning services The FHW gathered information on births and deaths during her routine home visiting and longitudinal surveys, and especially the fertility survey.

Since no services were offerred in the control group, no FHW was available to gather vital statistics data in these villages. Moreover, in villages receiving only family planning education (FP-Ed) the duties of the workers employed by the project did not include the same intensive case-finding and follow-up of pregnant women which were the responsibility of the FHW in connection with the delivery of maternal and child care services. Thus the coverage for data collection by the worker in the FP-Ed group may have been less complete than that of the FHW in the four groups receiving health services.

In addition to the above methods of continuous data collection, births were also recorded in two cross-sectional surveys - the pregnancy history and the population census. Finally before the end of the project in May 1974, a special vital statistics retrospective survey was conducted to validate information on all births and deaths which had occurred since 1970. Except for some differences in timing of the pregnancy history and census surveys these sources were essentially comparable for all the groups.

In the figures that were finally used, data from all of these sources were totalled whenever a reported birth was recorded as having occurred to a village resident with an identification number, after checking for duplicate records in all sources. However, in the case of both the control villages and the villages receiving family planning education, an adjustment for under-reporting appears warranted. As noted above, only two of the three sources of continuous data collection were uniformly available across all six village groups, and one of those sources, the chowkidar, did not report outgoing births. The absence of the FHW as a source of data, with her intensive case-finding and follow-up duties, obviously resulted in under-reporting in these two groups. Therefore, in addition to computing crude birth rates from the raw data from these experimental groups, we have also adjusted for under-reporting by introducing the following correction:

Let T be the total births from all sources in the four experimental groups with comparable data sources (i.e., FP+WS+CC, FP+WS, FP+CC, NUT Other. Let X equal those births in the four groups which are

identified from the sources common to all six experimental groups. Let Z equal all births in these four groups identified from the source which is not available to the Control-P and FP-Ed groups. If Y represents those births which are common to X and Z, then the exclusive contribution of the non-uniform source is given by Z-Y, and T = X+(Z-Y). A correction factor T/X is computed for each calendar year and applied to the Control-P and FP-Ed groups for the same year. If C is the number of births in one of these two experimental groups which are contributed by sources common to all six groups, then the total number of births is estimated as CT/X. The age-standardized general fertility rates (AGFR) and total fertility rates (TFR) in these groups may also be adjusted by the same factor, assuming that the age-patterns of fertility detected by the different sources are similar.

In the tables that follow we have presented both the adjusted and unadjusted rates for these groups of villages for each calendar year.

Finally, a note is in order on the use of an age-standardized general fertility rate. Differences among groups in the age distribution of women, and within groups over time, can obscure or accentuate real differences in fertility. An examination of the age data for each village-group by calendar year shows remarkable uniformity among groups, and within groups over time, with the exception of the FP-Ed group. Table IV.B.1 and Figure IV.B.1 show the cumulative percent distributions of women by age, averaged over the five year period, 1969-1973. The distribution in the FP-Ed group is considerably older, suggesting that women in the young child bearing ages were somehow being missed. It was this suggestion of missing data which led to the calculation of age-standardized rates. However, the rates so calculated, as well as the total fertility rate, appear to be high for this group for the years prior to the initiation of services in these villages, suggesting further that the women we did contact may have been selected for high fertility. Thus, a special caution is required in the interpretation of data from the FP-Ed experimental group.

2. Changes in Fertility

in Tables IV.B.2, IV.B.3 and IV.B.5, three indices of fertility level are presented for each of the service groups for each calendar year. These indices are:

a. crude birth rate (number of annual births per 1000 mid-year population) (Table IV.B.2);

b. age-standardized general fertility rate (number of annual births per 1000 women aged 15-49, standardized to the population five-year average age distribution) (Table IV.B.3); and

c. total fertility rate (5 times the sum of the five-year age-specific fertility rates) (Table IV.B.5).

Absolute and percentage reduction in these indices from the 1969-70 level to the end of the program period are shown in each table, and similar tabulations from the 1971-72 rates are shown for the FP-Ed group. For comparison with Table IV.B.3, Table IV.B.4 shows general fertility rates without the age adjustment.

These three indices of the level of fertility tell very much the same story. In the two groups of villages we were using as control, i.e., the experimental groups labeled Control-P and NUT Other, declines were minimal during the period, when they were adjusted for under-reporting as discussed above. This might possibly be a reflection of an apparent slowing in the long-term downward trend in fertility in Ludhiana District noted in Section II.B.

In the two experimental groups receiving women's services and family planning (FP+WS+CC and FP+WS), rates of fertility decline and the fertility levels achieved in 1973 are very similar, despite slightly different starting levels. In both of these groups each of the measure were reduced by 17-19 percent from 1969-70 to 1973, or by approximately 5 percent a year. The group receiving family planning education (FP-Ed) registered the most rapid declines in all measures if one does not adjust for under-reporting due to the absence of the service component in these villages. If this

adjustment is made, the percent decline in CBR of this group is nearly identical to that of the two groups providing women's services, and percentage declines in AGFR, GFR and TFR are similar.

As noted in several places in this report, the data from the group receiving family planning education alone must be interpreted with caution. Despite a high rate of contraceptive usage that was achieved in the slightly less than two years of field work, it is difficult to credit the program with such a dramatic fertility effect, for such usage would have had little chance to be reflected in the birth rates, given the necessary lag of the gestation period. When one adds to this a concern about the validity of data collected retrospectively for the years 1969-71, the apparent under-reporting for younger women, yet at the same time the relatively high fertility of these young ages, the non-comparability of the Family Planning Educator and the FHW as data sources - one suspects that the large decline in fertility in this group is in part due to an artifically high initial level. It may be possible to tease the answer to this puzzle out of the data at some later date through detailed examination of the contribution of the several data sources. Meanwhile caution is advised.

Nevertheless, these results do suggest that a focus of effort on women, whether for family planning education alone or in combination with women's services, was associated with the achievement of the most rapid declines in fertility levels, whether measured by crude birth rate, age-standardized general fertility rate, or total fertility rate. The fertility declines registered by the experimental group receiving child care services plus family planning but no women's services (FP+CC), were not impressive, although they were somewhat greater than the control groups (CONT-P and NUT Other).

But fertility reduction is not the only parameter of interest. Given the high risks of infant and maternal mortality that are associated with births to very young or to older women, and/or with high parity births, we have also been concerned to shift the whole age-parity pattern of fertility toward one which in addition to lowering fertility, concentrates that fertility into the optimum years for child-bearing. Tables IV.B.6 to IV.B.11

illustrate the 1973 age-parity grid for each group. Tables IV.B.12 and IV.B.13 illustrate changes over time by experimental group in the median age of women giving birth from 1969-70 to 1973, and in the median parity of those births. There is relatively little change in any of the groups over time in the median age of women giving birth, but each of the groups experienced some reduction in the median parity of births. Here we observe a different pattern of inter-group differences. Once again the FP-Ed and the FP+WS+CC villages are similar, registering the most dramatic reductions in median parity, but the child care group (FP+CC) also shows a reduction which is subtantially as great from 1969-70 to 1973. These three groups have apparently been successful in shifting the locus of child-bearing toward the lower parities, while the other three groups register little or no change.

Finally, a third pattern of inter-group differences is shown in Table IV.B.14, where change over time in the percent of excess fertility by experimental group is shown. Once again all groups register declines, and once again the most dramatic declines are in the FP-Ed and comprehensive care (FP+WS+CC) villages. Moreover, the two sets of control villages (CONT-P and NUT Other and the child care (FP+CC) group also register respectable declines from 1969-70 to 1973. The women's services group (FP+WS), however, exhibits only a very slow decline in excess fertility. These patterns are summarized in Table IV.B.15. Future analyses of birth interval dynamics could help interpret these changes in age-parity patterns of fertility.

Without a detailed analysis linking the specific program inputs to these fertility parameters, one can only speculate here about differential program impacts. An explanation undoubtedly lies in the interaction between specific program inputs and the particular clientele reached by those programs.

From these data one might hypothesize that if one is providing child care services, then combining them with family planning will tend to shift the age-parity pattern toward a more optimal one for family health, but that this will not necessarily result in major fertility reduction over the short run, before decreasing child mortality begins to have an effect. On the

other hand, if the major objective is immediate fertility reduction, then a direct focus on the women themselves will bring about the most dramatic fertility declines in a relatively short period. And if one wants to bring about major fertility declines and a shift in the age-parity pattern at the same time, either comprehensive services (FP+WS+CC) or family planning education (FP-Ed) alone will be equally effective in the initial years of a program. If the impact of family planning education alone is not an artifact of the data, it is this latter finding which is most difficult to interpret.

Table IV.B.1

CUMULATIVE PERCENT DISTRIBUTION OF WOMEN BY AGE
AND EXPERIMENTAL GROUP,
AVERAGED OVER 5-YEAR PERIOD, 1969-1973

AGE GROUP	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT OTHER	TOTAL
15-19	23	23	23	21	25	23	23
20-24	44	44	44	39	45	44	44
25-29	59	60	60	53	60	58	59
30-34	71	74	71	64	73	70	71
35-39	82	83	81	78	83	81	82
40-44	92	93	92	91	92	92	92
45-49	100	100	100	100	100	100	100

Table IV.B.2

CRUDE BIRTH RATE BY CALENDAR YEAR AND EXPERIMENTAL GROUP
1969-1973

EXPERIMENTAL GROUP	CALENDAR YEAR 1969-1970	1971	1972	1973	Change 1969-1970 to 1973	% Change 1969-1970 to 1973
FP+WS+CC	34.4	33.8	33.9	28.7	-5.7	-16.6
FP+WS	37.0	33.7	38.6	30.6	-6.4	-17.3
FP+CC	33.4	36.9	32.2	32.0	-1.4	- 4.2
FP-Ed.	37.5	-- 34.0 --		28.6	-8.9(-5.4)	-23.7(-15.9)
(Adj.) FP-Ed.	38.5	-- 35.3 --		32.1	-6.4(-3.2)	-16.6(- 9.1)
CONT-P	33.1	36.7	29.3	29.8	-3.3	-10.0
(Adj.) CONT-P	32.3	36.0	30.4	32.3	0.0	0.0
NUT Other	32.1	34.0	26.7	31.8	0.3	- 0.9

Note 1: Values in parentheses are reductions from 1971-1972 rates. See text for discussion of the reliability of data from the FP-Ed. group, especially for 1969-1971.

Note 2: See text for discussion of the procedure for adjustment for the absence of one vital statistics data source in the FP-Ed. and CONT-P groups.

Table IV.B.3

AGE-STANDARDIZED GENERAL FERTILITY RATE BY CALENDAR YEAR
AND EXPERIMENTAL GROUP
1969-1973

EXPERIMENTAL GROUP	CALENDAR YEAR 1969-1970	1971	1972	1973	Change 1969-1970 to 1973	% Change 1969-1970 to 1973
FP+WS+CC	155.6	152.7	154.8	129.0	-26.6	-17.1
FP+WS	159.3	146.8	162.3	129.2	-30.1	-18.9
FP+CC	152.1	163.9	140.1	144.0	- 8.1	- 5.3
FP-Ed.	187.9	-- 171.2 --		142.6	-45.3(-28.6)	-24.1(-16.7)
(Adj.) FP-Ed.	190.0	-- 177.7 --		160.2	-28.8(-17.5)	-15.2(- 9.8)
CONT-P	148.2	159.5	126.8	130.1	-18.1	-12.2
(Adj.) CONT-P	144.8	156.2	131.6	141.1	- 3.7	- 2.6
NUT Other	148.8	156.3	120.4	141.1	- 7.7	- 5.7

Note 1: Values in parentheses are reductions from the 1971-1972 rates. See text for discussion of the reliability of data from the FP-Ed. group, especially for 1969-1971.

Note 2: See text for discussion of the procedure for adjustment for the absence of one vital statistics data source in the FP-Ed. and CONT-P experimental groups.

Note 3: General fertility rates have been standardized to the average age distribution of all cohorts over the 5 years, 1969-1973, to adjust for age differences between FP-Ed. and all other experimental groups. See text for discussion of age distributions.

Table IV.B.4

GENERAL FERTILITY RATE BY CALENDAR YEAR AND EXPERIMENTAL GROUP
1969-1973

EXPERIMENTAL GROUP	CALENDAR YEAR				Change 1969-1970 to 1973	% Change 1969-1970 to 1973
	1969-1970	1971	1972	1973		
FP+WS+CC	155.6	151.3	151.3	130.4	-25.2	-16.2
FP+WS	163.5	145.9	165.8	133.4	-30.1	-18.4
FP+CC	152.1	164.8	143.8	145.9	- 6.2	- 4.1
FP-Ed.	178.2	-- 159.6 --		128.4	-48.8(-32.2)	-27.4(-20.2)
(Adj.) FP-Ed.	182.4	-- 165.6 --		144.3	-38.1(-21.3)	-20.9(-12.9)
CONT-P	147.4	157.1	124.4	129.1	-18.3	-12.4
(Adj.) CONT-P	144.0	153.9	129.1	140.1	- 3.9	- 2.7
NUT Other	145.6	152.3	118.7	141.9	- 3.7	- 2.5

Note 1: Values in parentheses are reductions from the 1971-1972 rates. See text for discussion of the reliability of data from the FP-Ed. group, especially for 1969-1971.

Note 2: See text for discussion of the procedure for adjustment for the absence of one vital statistics data source in the FP-Ed. and CONT-P groups.

Table IV.B.5

TOTAL FERTILITY RATE BY CALENDAR YEAR AND EXPERIMENTAL GROUP
1969-1973

EXPERIMENTAL GROUP	CALENDAR YEAR 1969-1970	1971	1972	1973	Change 1969-1970 to 1973	% Change 1969-1970 to 1973
FP+WS+CC	.4907	.4912	.4819	.4075	-.0832	-17.0
FP+WS	.4941	.4610	.5025	.4021	-.0920	-18.6
FP+CC	.4858	.4944	.4463	.4394	-.0464	- 9.6
FP-Ed.	.5972	--	.5454 --	.4333	-.1639(-.1121)	-27.4(-20.6)
(Adj.) FP-Ed.	.6112	--	.5663 --	.4868	-.1244(-.0795)	-20.4(-14.0)
CONT-P	.4642	.4878	.4073	.4025	-.0617	-13.3
(Adj.) CONT-P	.4536	.4778	.4227	.4367	-.0169	- 3.7
NUT Other	.4658	.4978	.3806	.4483	-.0175	- 3.8

Note 1: Values in parentheses are reductions from 1971-1972 rates. See text for discussion of the reliability of data from the FP-Ed. group, especially for 1969-1971.

Note 2: See text for discussion of the procedure for adjustment for the absence of one vital statistics data source in the FP-Ed. and CONT-P group.

E R R A T A

Table IV.B.5

TOTAL FERTILITY RATE BY CALENDAR YEAR AND EXPERIMENTAL GROUP
1969-1973

EXPERIMENTAL GROUP	CALENDAR YEAR 1969-1970	1971	1972	1973	Change 1969-1970 to 1973	% Change 1969-1970 to 1973
FP+WS+CC	4907	4912	4819	4075	-832	-17.0
FP+WS	4941	4610	5025	4021	-920	-18.6
FP+CC	4858	4944	4463	4394	-464	- 9.6
FP-Ed.	5972	-- 5454	--	4333	-1639(-1121)	-27.4(-20.6)
(Adj.) FP-Ed.	6112	-- 5663	--	4868	-1244(-795)	-20.4(-14.0)
CONT-P	4642	4878	4073	4025	-617	-13.3
(Adj.) CONT-P	4536	4778	4227	4367	-169	- 3.7
NUT Other	4658	4978	3806	4483	-175	- 3.8

Note 1: Values in parentheses are reductions from 1971-1972 rates. See text for discussion of the reliability of data from the FP-Ed. group, especially for 1969-1971.

Note 2: See text for discussion of the procedure for adjustment for the absence of one vital statistics data source in the FP-Ed. and CONT-P group.

Table IV.B.6

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
FP+WS+CC EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	7	28	6						41	22.0	22.4
2	3	30	14	2					49	26.3	23.6
3		8	19	1	1				29	15.6	26.7
4		6	5	8	2				21	11.3	29.5
5				5	3				8	4.3	34.0
6			6	2	3	2			13	7.0	31.3
7			2	4	3	1			10	5.4	33.8
8+			1	4	6				11	5.9	35.4
Unknown		4							4	2.2	22.5
Total	10	76	53	26	18	3			186	100.0	25.7
%	5.4	40.9	28.5	14.0	9.7	1.6			100.0		
Median Parity	1.2	1.8	2.8	4.9	6.5	6.3			2.5		

Table IV.B.7

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
FP+WS EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	4	21	1	3		2		1	32	20.5	22.7
2	7	19	6	2				2	36	23.1	22.6
3	1	9	9	2	1			2	24	15.4	25.6
4	1	8	5	3					17	10.9	24.7
5	1	1	10	7	1		1		21	13.5	29.3
6			2	5	2				9	5.8	32.5
7				4	2		1		7	4.5	34.4
8+				2	4				6	3.8	36.3
Unknown		2	2						4	2.6	25.0
Total	14	60	35	28	10	2	2	5	156	100.0	25.2
%	9.0	38.5	22.4	17.9	6.4	1.3	1.3	3.2	100.0		
Median Parity	1.9	1.9	3.6	5.1	7.0	1.0	6.0	2.3	2.8		

Table IV.B.8

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
FP+CC EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	5	24	3	2				2	36	22.5	22.5
2	6	17	7		2	1			32	20.0	22.9
3		12	19	1	1	1			34	21.2	26.3
4		4	11	4					20	12.5	27.7
5		1	8	5	1				15	9.4	29.1
6		1	2	4					7	4.4	30.6
7				4	2				6	3.7	33.8
8+				2					2	1.2	32.5
Unknown	1	3	2	2					8	5.0	25.0
Total	12	62	52	24	6	2		2	160	100.0	25.5
%	7.5	38.7	32.5	15.0	3.7	1.2		1.2	100.0		
Median Parity	1.6	1.8	3.3	5.3	3.5	3.5		1.0	2.7		

Table IV.B.9

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
FP-ED. EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	7	20	4		1			2	34	21.0	22.3
2	2	23	9	2				1	37	22.8	23.5
3		17	13	2	3				35	21.6	25.2
4		2	12	5	4				23	14.2	29.0
5			4	2	1	1			8	4.9	30.0
6			4	2	3				9	5.6	31.3
7			1	2	1	1			5	3.1	33.8
8+			2		3	2	1		8	4.9	38.3
Unknown		1	2						3	1.9	26.3
Total	9	63	51	15	16	4	1	3	162	100.0	25.7
%	5.6	38.9	31.5	9.3	9.9	2.5	0.6	1.9	100.0		
Median Parity	1.1	2.0	3.4	4.2	4.5	7.5	8.0	1.3	2.7		

Table IV.B.10

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
CONT-P EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	4	21	4						29	17.6	22.5
2	3	22	9	1	1			1	37	22.4	23.4
3		11	12	2	1			2	28	17.0	25.8
4		3	12	8	2	1			26	15.8	29.2
5		3	1	7	2			1	14	8.5	31.8
6			3	2	3				8	4.8	32.5
7				5	1	1			7	4.2	33.5
8+			2	1	1	1			5	3.0	32.5
Unknown	1	9	1						11	6.7	22.5
Total	8	69	44	26	11	3		4	165	100.0	25.4
%	4.8	41.8	26.7	15.8	6.7	1.8		2.4	100.0		
Median Parity	1.4	1.9	3.2	4.8	5.3	7.0		3.0	2.9		

Table IV.B.11

AGE-PARITY GRID FOR LIVEBIRTHS, 1973
NUT OTHER EXPERIMENTAL GROUP

PARITY	AGE OF WOMEN IN YEARS								TOTAL		MEDIAN AGE
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	UNKNOWN AGE	N	%	
1	7	19	5	2	1	1			35	13.7	22.8
2	6	30	14	4	1				55	21.5	23.6
3	2	10	20	5	1		1		39	15.2	26.9
4		7	16	9	2				34	13.3	28.1
5			13	18	3				34	13.3	31.1
6			6	3	1				10	3.9	29.2
7			1	4	1				6	2.3	32.5
8+					4				4	1.6	37.5
Unknown	4	20	10	4			1		39	15.2	23.9
Total	19	86	85	49	14	1	2		256	100.0	26.4
%	7.4	33.6	33.2	19.1	5.5	0.4	0.8		100.0		
Median Parity	1.6	2.0	3.4	4.6	5.2	1.0	3.0		3.0		

Table IV.B.12

MEDIAN AGE OF WOMEN GIVING BIRTH, 1969-1973
BY EXPERIMENTAL GROUP

YEAR	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other
1969	25.8	25.5	25.3	26.9	25.6	25.5
1970	25.0	24.7	25.4	27.6	25.8	24.7
1971	26.2	25.2	24.6	25.7	25.1	25.2
1972	25.3	25.3	26.3	27.3	26.4	25.3
1973	25.7	25.2	25.5	25.7	25.4	25.2

Table IV.B.13

MEDIAN PARITY OF BIRTHS, 1969-1973
BY EXPERIMENTAL GROUP

YEAR	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other
1969	3.8 }3.5	3.5 }3.5	3.3 }3.7	4.0 }3.8	3.2 }3.6	3.5 }3.6
1970	3.1	3.5	4.0	3.6	3.9	3.7
1971	3.7	3.2	3.4	3.3	3.3	3.4
1972	3.4	3.5	3.3	3.8	3.6	3.6
1973	3.0	3.3	3.2	3.2	3.4	3.5
Change 1969 to 1973	-0.8	-0.2	-0.1	-0.8	+0.2	0.0
Change 1969-1970 to 1973	-0.5	-0.2	-0.5	-0.6	-0.2	-0.1

E R R A T A

Table IV.B.13

MEDIAN PARITY OF BIRTHS, 1969-1973
BY EXPERIMENTAL GROUP

YEAR	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other
1969	3.3 }3.5	3.0 }3.0	2.8 }3.2	3.5 }3.3	2.7 }3.1	3.0 }3.1
1970	2.6	3.0	3.5	3.1	3.4	3.2
1971	3.2	2.7	2.9	2.8	2.8	2.9
1972	2.9	3.0	2.8	3.3	3.1	3.1
1973	2.5	2.8	2.7	2.7	2.9	3.0
Change 1969 to 1973	-0.8	-0.2	-0.1	-0.8	+0.2	0.0
Change 1969-1970 to 1973	-0.5	-0.2	-0.5	-0.6	-0.2	-0.1

Table IV.B.14

PERCENT "EXCESS FERTILITY"
(i.e., Births to Women <20 Years or ≥40 Years,
Plus Births of Parities >4 to Women Age 20-39),
1969-1973, BY EXPERIMENTAL GROUP

YEAR	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	CONT-P	NUT Other
1969	47.0 }44.1	43.4 }43.5	37.8 }42.4	43.8 }43.3	44.2 }40.6	41.8 }42.1
1970	41.1	43.6	47.0	42.7	37.0	42.3
1971	39.0	40.4	39.9	45.8	41.1	38.6
1972	38.5	36.3	28.5	35.3	35.1	37.8
1973	28.6	38.2	31.6	26.4	32.7	32.7
Change 1969 to 1973	-18.4	-5.2	-6.2	-17.4	-11.5	-9.1
Change 1969-1970 to 1973	-15.5	-5.3	-10.8	-16.9	-7.9	-9.4

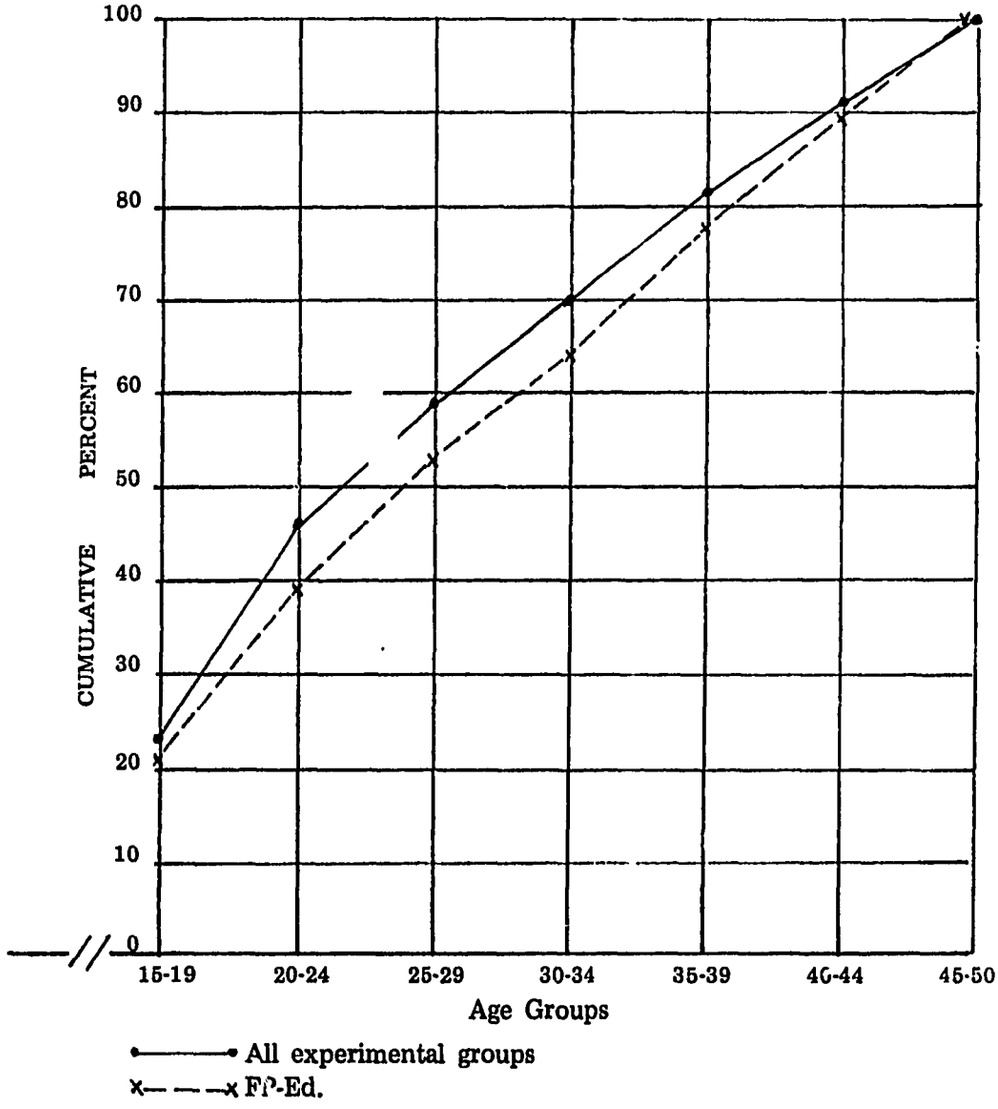
Table IV.B.15

SUMMARY: CHANGES IN FERTILITY 1969-1970 to 1973

EXPERIMENTAL GROUP	FERTILITY INDICES	MEDIAN PARITY	% EXCESS FERTILITY
FP+WS+CC (Adj.)FP-Ed.	Dramatic rates of decline in all indices (CBR, ASFR, TFR): 17-19%	Dramatic decline in median parity: ≥0.5 child	Dramatic reduction in excess fertility: 16-17 points
FP+WS	Dramatic rates of decline in all indices (CBR, ASFR, TFR): 17-19%	Little change in median parity	Little reduction in excess fertility
FP+CC	Low rates of decline in all indices (CBR, ASFR, TFR): 4-5%	Dramatic decline in median parity: 0.5 child	Moderate reduction in excess fertility 10 points
(Adj.)CONT-P NUT Other	Little change in any index (CBR, ASFR, TFR)	Little change in median parity	Moderate reduction in excess fertility 8-9 points

Figure IV.B.1

CUMULATIVE PERCENT DISTRIBUTION OF WOMEN BY AGE
ALL EXPERIMENTAL GROUPS AND FP—Ed. GROUP - 1969-73 Av.



C. EFFECTIVE USE OF CONTRACEPTION

Discontinuation of methods of contraception due to various reasons was discussed in the section on the practice of family planning. Since those were verbalized responses, the failure rates of contraception were likely to be incomplete due to two reasons: (1) all pregnancies which occurred during contraception may not have been reported, (2) unplanned pregnancies may have been reported as planned pregnancies. If fertility behavior of couples is to be related directly to the extent of contraception, an accurate account of contraceptive failure would be needed. In order to accomplish this, all births which occurred to couples during 3.25 years of program exposure (October 1970 - December 1973) were compared with the mothers' contraceptive behavior. If the conception date of a birth happened to be during the period of use of a method, it was counted as a failure of that method. If the conception date was during a break in contraception, it was counted as a pregnancy during a non-contraception period of a family planning acceptor. For each acceptor, the duration of use of each method as well as of periods of non-contraception were computed. On the other hand, if the birth occurred to a woman who had never been an acceptor of family planning and if the conception date was between October 1970 and December 1973 it was counted as a pregnancy occurring to a non-acceptor during the 3.25 years of exposure.

Pregnancy rates per 100 years of exposure were computed for all non-acceptors of family planning, and for acceptors separately for periods of use and non-use of contraception methods. The pregnancy rates thus computed are presented for the four experimental groups in Table IV.C.1.

There are limitations in the validity of these rates which we expect to resolve in further analysis. First, in the computation of exposure periods, duration of non-susceptibility to pregnancy from conditions such as post-partum amenorrhea were not excluded. Since we have detailed records of post-partum amenorrhea we expect to dissect more carefully this component of birth intervals. Second, among non-acceptors of family planning, only

those women who gave birth during the study period of 3.25 years were considered. Since almost all fecund women have at least one birth during a 39-month period, this limitation amounts to exclusion of sterile and sub-fecund women.

From Table IV.C.1 it may be seen that the highest failure rates in these villages occurred during use of condom and oral pill. Effectiveness of condom use was uniformly poor in all groups while effectiveness of pill use varied greatly from one group to another. Failure of contraception in general, regardless of method, was around 10 per 100 woman years of exposure, while it was close to 15 in the case of FP+CC group. During breaks in contraceptive use, pregnancy rates were not markedly different among groups, ranging around 30 per 100 woman years of exposure. The pregnancy rates in the four groups of women who never accepted a family planning method were also similar, ranging from 39.6 to 41.3 per 100 woman years of exposure.

Table IV.C.1

PREGNANCY RATES DURING USE OF DIFFERENT FAMILY PLANNING METHODS
BY EXPERIMENTAL GROUP
(Pregnancies per 100 Woman Years of Exposure)

	FP+WS+CC	FP+WS	FP+CC	FP-Ed.	ALL GROUPS
USERS OF FAMILY PLANNING					
Condom	21.8	28.4	32.9	23.3	26.8
Pill	44.6	28.7	0.0	69.5	29.2
IUD	8.5	2.2	12.2	5.9	5.2
Inj. D-P	4.0	3.4	0.0	0.0	3.1
Vasectomy	0.0	0.0	4.5	0.0	1.0
Tubectomy	0.0	1.1	0.0	11.7	1.1
All Methods	10.8	9.0	14.5	10.0	10.8
Break in Contraception	31.0	32.6	28.8	30.3	30.7
NON-ACCEPTORS	41.3	40.9	41.0	39.6	40.7

D. HEALTH BENEFITS

Measurement of health benefits was important for two reasons: first, we wanted to see what impact there was on health from the various experimental inputs; second, testing the child survival hypothesis required a health care program that improved child health enough so that it would be noticed by the parents and the village community. The task was made more difficult by our self-imposed aim of ensuring that our child care services would be replicable in the national program under the financial and manpower constraints prevailing in India and other less developed countries.

Only one previous field study had, to our knowledge, attempted to affect parameters of health of rural preschool children populations by using different service inputs in total village populations. In three villages in the Guatemalan highlands, INCAP had conducted research with one village receiving food supplementation, a second environmental measures for infectious disease control, and a third receiving no services other than emergency care (Guzman et al 1968). The results of the Guatemalan study were somewhat inconclusive in the comparison of food supplementation with infectious disease control. The results were, however, sufficiently suggestive to warrant further experimentation incorporating an experimental group combining food supplementation and infectious disease control.

The Nutrition Project which was conducted in parallel with the Population Project and had overlapping child care villages was specifically an investigation of the determinants of child health. Effects of different service packages on selected parameters of child health (weight and height gain, morbidity and mortality experience) were measured through longitudinal surveys in both projects. One of the objectives of the Population Project was to determine impact of these parameters on family planning practice and to measure the influence of family planning on health. Child health was monitored through anthropometric, morbidity and mortality in the FP+WS+CC group, and mortality alone in all other groups of the Population Project. Relevant findings based on data from both projects are presented in this section.

Descriptions of the anthropometric and morbidity surveys were given in Section I. Mortality data were collected twice-monthly using the same sources as described under birth reporting. In service villages vital statistics registration was virtually complete because of the multiple sources - personnel (resident family health worker, vital statistics investigator, chowkidar) and surveys (anthropometry, morbidity, census, pregnancy history). Underreporting was suspected in the control villages of the Population Project due mainly to the absence of the resident family health worker. As with birth rates an appropriate correction factor was developed in the analysis of mortality data to take this into account.

Although the children's service groups of primary concern in this report are FP+WS+CC and FP+CC, data from the other Nutrition Project groups are included to illustrate the differential effects of nutrition programs and infection control on the health of children. Analysis of the morbidity data, available only in the Nutrition Project villages is still in process and will be presented in the detailed report of that project.

1. Growth

From the start of the longitudinal anthropometric survey in October, 1968, until the conclusion of the study in May, 1973, 15,365 visits were made by resident family health workers (FHW) in the Nutrition Project to obtain anthropometric measurements at prescribed protocol ages. (Findings from the FP+WS+CC group of villages have not been included since their analysis was incomplete at the time of this report.) A total of 21,182 visits had been scheduled with 21 visits per child. The overall participation rate for getting the scheduled anthropometric measurements was thus 73 percent. Participation was highest in villages receiving nutrition services alone, lowest in the Nutrition Project control villages. The frequency of obtaining measurements declined with increasing age of the child, was unaffected by the season of measurement, declined slightly after 1970, and was higher among low caste females.

a. Weight differences by experimental group and other variables

Significant differences were found among experimental groups in average weights and heights. At ages 17 months and above, differences in

average weight among the four Nutrition Project experimental groups were statistically significant (P<.05) and consistent in direction: children in villages receiving nutrition care (NUT), whether alone or in combination with infection control services (IDC), exhibited the highest mean weights; those receiving infection control alone the next highest; and those in the control villages (CONT-N) the lowest. This pattern held for high and low castes and for males and females alike. Average weight, adjusted for unequal sex-caste composition among the experimental groups and expressed as a percentage of the Harvard standard weight is illustrated in Figure IV.D.1 and Table IV.D.1 for ages above one year. Differences between the nutrition care and control villages were in the order of 3 percentage points, corresponding to 0.4 Kg beyond two years of age, and reaching a maximum of 4.5 percentage points, corresponding to 0.7 Kg, at 36 months of age. Differences in average weight at ages below 13 months were not statistically significant (P>.10) except at birth, at which time the control averages were the highest.

Sex and caste showed a highly significant (P<.001) effect upon weight at every age. Male averages were from 0.6 Kg to 1 Kg higher than female averages with the largest differences occurring in the fifth through the 17th months. Beyond the age of one year, Jat average weights were approximately 0.75 Kg higher than Ramdasia averages with other caste averages about 0.6 Kg higher.

Season similarly was significantly (P<.001) related to mean weight at most ages. Weights recorded in the wet (July-September) months and hot (April-June) seasons were consistently lower than those recorded in either the mild (October-November, March) or cold (December-February) seasons.

Variations in weight according to year of measurement, after adjustment for experimental group and seasonal effects, and the length of stay within the group were generally not significant (P>.10).

The number of siblings alive at the time of the child's birth was generally a significant (P<.05) influence upon mean weight. Five sibling categories were considered: (1) 0-1 males, 0-1 females; (2) 0-1 males, 2+ females; (3) 2+ males, 0-1 females; (4) 2+ males, 2+ females; (5) unknown. Adjustments were made for unequal sex and caste distributions. Those of

unknown birth order were thought to be mostly first births, although this could not be verified through the pregnancy history surveys. The distribution of children was 45, 18, 18, 11 and 8 percent respectively in these five sibling classifications. For every age, those with two or more male siblings, regardless of the number of female siblings, had the lowest average weights. Children with two or more male siblings and two or more female siblings had a mean weight in the order of 0.4 Kg less than those with less than two male siblings and two or more female siblings. Children in the 2+ males, 0-1 females group had mean weights on the order of 0.2 Kg less than those in the 0-1 male, 0-1 female group.

b. Height differences by experimental group and other variables

At ages 21 months and above, average height was significantly higher ($P<.01$) in the nutrition care groups, with or without infection control, than in control villages. Villages receiving only infection control had intermediate mean heights (Table IV.D.2, Figure IV.D.2). Differences between the nutrition and control groups were of the order of 2 cm beyond two years of age.

Sex and caste had a very strong influence ($P<.001$) upon heights. Male averages were approximately 2.7 cm higher than female averages in the age range 9-17 months, with differences then decreasing to slightly less than 2 cm at ages 27 months and above. Differences in average height between Jat and Ramdasia castes increased from 1.4 cm at age 9 months to approximately 2.5 cm after age two years. Other caste group heights were from 1.2 to 2 cm greater than Ramdasia caste heights. Hence, during the third year of life, the influences of sex, caste, and service programs were nearly equal. A high caste male in a nutrition care village had an average height of 6 cm more than a low caste female in a control village.

The number of siblings in the child's family had a significant effect upon average height, with the direction of differences being the same as for weight. Children with two or more male siblings had the lowest average heights regardless of the number of female siblings. Those with two female siblings in addition to two or more male siblings were of particularly low height, and were in the order of 1.3 cm less than those with only one or no

living brot[illegible] [illegible] averages among the known age classifications were generally less than 1 cm.

2. Mortality

a. Mortality rates

Vital statistics registration was initiated in most villages early in 1969 or when the villages were introduced into the experimental groups. By 1970 a data collection methodology uniform for all service villages had been set up, relying essentially on three sources of vital statistics information: the resident health worker, especially appointed vital statistics investigators and the chowkidar. In the control villages of the population project, only the latter two sources were available. For this reason, rates for these villages are given both crudely and following correction after adjustment for underreporting. The correction factor employed reflects the percentage underreporting encountered in all service villages if chowkidar and vital statistics investigators data alone were utilized. (See Section IV.B for description of the adjustment procedure.)

1) Mortality differential by experimental group

In the nutrition project the nature of one of the dependent variables--morbidity--required a much higher frequency of surveying than was necessary in the FP+WS+CC experimental group of the population project. Morbidity information relied almost entirely on the mother's recall, in contrast to anthropometry and mortality which were not subject to this limitation. The increased frequency of home visiting for morbidity data collection (once weekly) undoubtedly greatly facilitated early recognition of potentially serious conditions, especially the under one-year olds, and this contributed to prompt treatment or referral. This increased patient contact is shown in the section on service inputs. Because of this, the service input of the child care component of the Population Project in the FP+WS+CC group is not strictly comparable to that of the Nutrition Project.

Below one year of life service programs seemed to have a significant effect, mainly on postneonatal and perinatal death rates. Thus in the two groups of the Nutrition Project where infectious disease control (IDC) was provided, postneonatal mortality was lowest (32 and 25 per 1,000 live births).

Without such services comparable rates ranged between 41 in the combined control groups of both projects to 56 in the FP+WS villages (Table IV.D.3). The difference in postneonatal mortality between infants in villages with intensive infectious disease control (FP+CC and IDC groups) and those without any child care (FP+WS; NUT; combined control groups) was found to be statistically significant ($P<.05$).

The observed reduction in infant mortality in the FP+CC and IDC groups is thus mainly due to their reduced postneonatal mortality. The comprehensive care villages of the Population Project (FP+WS+CC) had a surprisingly high postneonatal death rate, which in essence, was not different from that of the FP+WS group. When compared with the impact on mortality made by the intensive home visiting in the FP+CC and IDC groups it would appear that the care provided to infants in the FP+WS+CC group was inadequate.

Perinatal mortality rates were reduced most in the two food supplementation groups (FP+CC; NUT) of the Nutrition Project. These were on the order of 47 and 69 respectively and were much less than in the two women's services groups (FP+WS+CC; FP+WS) of the Population Project which ranged above 80. This may perhaps be due to a certain amount of underreporting of stillbirths in the villages of the Nutrition Project, where most of the health worker's efforts were directed at the child. In the two experimental groups of the Population Project which incorporated women's services (FP+WS+CC; FP+WS), the added effort focussed on prenatal care might have helped detect stillbirths that would otherwise have eluded the health worker. This may be reflected in the fact that both for the 1970-71 and 1972-73 time periods the ratio of stillbirths to neonatal deaths within the first seven days was consistently, though not significantly lower statistically, in the Nutrition than the Population villages. Thus, in both years these ratios were approximately 4:6 in the Nutrition and 5:5 in the Population villages. If one assumes that the ratio of stillbirths to neonatal deaths within the first seven days in the women's service groups of the Population Project reflects the real situation and adjusts figures for the Nutrition Project villages accordingly, perinatal ratios still remain lowest in the two nutrition supplemented groups: under 54 for FP+CC and 63 for NUT respectively.

Children between one and three years of life in the two groups incorporating food supplementation plus infectious disease control (FP+WS+CC; FP+CC) experienced less than half the mortality observed in control villages. The mortality rates were intermediate in experimental groups with only infectious disease control or food supplementation. The difference in 1-3 mortality between the FP+WS+CC and FP+CC groups and all other experimental groups is statistically significant ($P<.025$). Observed mortality differences were not statistically significant between experimental groups for children three to five years of age. These children were above the age limit for the intensive nutrition and infectious disease control services. Their mortality rates were much lower than the 1-3 year old rates, providing a rational basis for concentrating services on children under three in health services with limited resources.

2) Change of mortality rates from 1970-71 to 1972-73 (June)

None of the mortality rates changed to any statistically significant degree from 1970-71 to 1972-73 for any of the experimental groups (Table IV.D.4). Analysis of change within the 3-1/2 year time span need therefore be limited to an examination of trends. Below one month of age rates tended to increase, while with increasing age of the child, service inputs seemed to produce somewhat improved child survival from one period to the next. Thus perinatal and neonatal death rates in the child service input villages increased by 10 percent and 4 percent respectively (Table IV.D.5), while postneonatal mortality decreased by 16 percent, resulting in a net decrease in infant mortality of 6 percent. In the control villages perinatal and infant mortality rates remained essentially stable, neonatal mortality showed a marked decline (21 percent) and postneonatal an increase (49 percent). We assume that the observed fluctuation in this experimental group within the first year of life may be due to incorrect age classification, especially since in the control villages of the Population Project, vital statistics information was collected by the chowkidar and the vital statistics investigators who had no access to exact birth information and needed to rely on the age at death given by the mother of the family.

3) Mortality rates by caste and sex

Perinatal and neonatal mortality rates reflect quite dramatically the universally observed higher vulnerability of the male infant. Thus the ratios of perinatal and neonatal male to female deaths were 1.30 and 1.24 respectively. After the first month and up to 3 years of life females suffered a significantly higher mortality. From one to twelve months of age, and between one and three years, the male to female mortality quotient reversed to 0.71 and 0.39 respectively. Between 3 and 5, mortality in both sexes appeared to finally revert to approximately equal rates. Perinatal and neonatal mortality by caste showed a somewhat unexpected pattern, with the high caste having the highest and the intermediate caste the lowest rates. This appears to be almost entirely due to a marked mortality differential for males, while female children of all three caste groups showed rather similar rates.

Male and female mortality rates between one month and three years tended to vary to a much lesser degree between male and females among the high caste than among the low or intermediate caste groups. Thus there was virtually no difference in postneonatal and a relatively small difference in the 1-3 year old rates among the high castes with male to female quotients of 1.03 and 0.71 respectively. For the low and intermediate caste groups comparable quotients were 0.72 and 0.30 and 0.40 and 0.33 respectively.

4) Mortality by season and age

Following correction for unequal seasonal distribution of births, mortality was looked at by age at death on a bimonthly basis over a three year period.

November and December had the lowest mortality rates for all age groups including stillbirths. Stillbirths were highest in January-February, when 26 percent of all such events occurred. Infant deaths peaked during the first six months of the year, notably during March and April; one to three year mortality during May and June; 3-5 year mortality during both January and February and May through August (Figure IV.D.3). Except for stillbirths, this pattern seemed to reflect age-specific vulnerability to specific infectious diseases as brought out in an in-depth investigation into the causes of all child deaths from 8 days to 5 years of age in 14 of the Narangwal

villages. Thus infant mortality is largely weighted by deaths from lower respiratory tract infections occurring during the cold season (mid-December to early March), one to three year mortality by diarrhea and dehydration and nutritional deficiency, worst during the hot months during and after the major harvest (April-August). It is somewhat unclear why stillbirths should follow a seasonal pattern. One possibility is that a number of neonatal deaths occur within the first day or so of life and that they were incorrectly classified as stillbirths. The fact that they occurred during the winter suggests there may have been a climatic influence. Another possibility is that there are factors influencing maternal health or nutrition which have differential seasonal effects.

b. Causes of death and social and demographic circumstances surrounding child mortality

Child deaths occurring in villages of the Nutrition and Population Projects were investigated in detail to determine underlying causes through examination of clinical, anthropometric, pregnancy and dietary information; available hospital and health center records; and interviews with the mother, the dai, the resident FHW and any physician involved. Of 165 perinatal deaths reported, 117 (70 percent) were investigated in detail in 18 villages over a 19-month time span. Of 125 deaths in eight day to five year olds, all but one were similarly investigated in 14 villages over a 29-month time span.

1) Perinatal deaths

There were 117 perinatal deaths. Fifty-six (48 percent) were stillborn; 61 (52 percent) were neonatal occurring before the eighth day of life. Fifty-eight percent of the stillbirths and 53 percent of the deaths within the first seven days were males. Birth weights were available only for 24 cases. Eleven (46 percent) weighed less than 2,000 grams; 58 percent were less than 2,500 grams. The underlying cause of death was determined in 103 (88 percent). Results were ranked as follows: extreme prematurity - 39 (38 percent); intrauterine asphyxia - 24 (23 percent); birth trauma - 22 (21 percent); congenital abnormality incompatible with survival - 8 (8 percent); aspiration as a result of spoon feeding - 3 (3 percent); neonatal pneumonia - 2 (2 percent); neonatal tetanus, neonatal

septicemia, criminal abortion in the last trimester and presumptive trauma in one case each (1 percent).

2) Deaths in eight day to five year olds

Of the 124 deaths investigated, 51 occurred in males, 73 in females giving a male to female ratio of 1:1.4. Thirty-one (25 percent) occurred between eight and 29 days; 30 (24 percent) between one and six months; 25 (20 percent) between six and twelve months; 23 (19 percent) between one and two years; 1 (1 percent) between two and three; and 9 (7 percent) between three and five years of age. Whereas the caste distribution among the children in the villages under examination was about 40 percent high caste, 40 percent low caste, 20 percent intermediate castes, the distribution of child deaths was 30 percent:47 percent:23 percent respectively.

In 15 (12 percent) the underlying cause of death could not be ascertained. Of the ones where the cause could be identified, 33 (30 percent) died from diarrheal disease; 23 (21 percent) from lower respiratory infection; 11 (10 percent) from fever and septicemia; 9 (8 percent) from nutritional deficiencies; 8 (7 percent) because of prematurity; 8 (7 percent) from accidents; 6 (6 percent) from tetanus neonatorum; and 11 (10 percent) from other causes. For 105 (85 percent) the birth weight or weight within the first eight days was determined. Thirty-seven percent had a birth weight less than 2,500 grams as compared to approximately 26 percent of total births in these villages. The nutritional status at death was known for 95 (77 percent) of children. Twenty (20 percent) were at or above 80 percent of the Harvard Standard, 15 (15 percent) between 70 percent and 80 percent, 19 (19 percent) between 60 percent and 70 percent, 19 (19 percent) between 50 percent and 60 percent and 22 (22 percent) were below 50 percent of the Standard. By comparing these percentages to those of the overall distribution of the Narangwal study children by their nutritional status one can obtain a good estimate of the risk of childhood mortality at different stages of malnutrition. Thus, when the services were fully developed approximately 80 percent of all preschool children in the 14 villages where growth was regularly monitored were above 70 percent of the Harvard weight standard; 15 percent between 60 and 70; 3 percent between 50 and 60; and about 2 percent below 50 percent of the same standard.

The in-depth interview with the mothers about the circumstances surrounding the death of the child focussed on events preceding the death, her recognition (or that of the family) of the seriousness of the illness, and their plan of action. For the purpose of this report cross tabulations of social and demographic variables and responses to only those questions that seem most relevant to child health and family size will be presented.

a) Intention to have another child: With increasing birth order progressively fewer mothers said that they intended to have another child after having experienced a child death (Table IV.D.6). Thus, when the deceased child was a first birth 83 percent of mothers stated at the time of the interview that they intended to have another child, compared to 12 percent when the child was of sixth or higher birth order. Also, with increasing birth order proportionately more mothers said they were undecided. Expressions of intent to have another child depended to a large extent on the number and sex of the surviving siblings. Thus when there were no surviving male siblings 48 of the mothers (79 percent) expressed an intent to have another child. When there were three or more sons alive, none of the mothers wanted to have another child. Only 34 mothers (56 percent) who had no surviving daughter expressed the intent to have another child; yet 5 (8 percent) of those having three or more living daughters intended to have another child. Overall no mother with five or more children of either sex intended to have another child, with 68 percent definitely saying no and 32 percent being undecided (Table IV.D.7).

b) Parental care: In order to determine whether, and to what extent, a child's socio-cultural environment and health status might influence parental concern and action during a terminal illness we cross-tabulated two parameters that we felt were indicative of parental care--namely, whether treatment was sought and if so, how soon after onset of the terminal illness. Other variables in the analysis were sex, caste, birth order, birth weight and nutritional status at death.

(i) Was treatment sought: There was no statistically significant difference between mothers of high, low or intermediate castes, sex of child or birth order. For children of less than 2,500 grams birth

weight and for severely malnourished children (below 50 percent of the Harvard Standard), significantly fewer mothers sought medical care ($P<.10$; $P<.025$) than for those of normal birth weight or of a nutritional status above 50 percent of the Harvard weight standard (Tables IV.D.8 and IV.D.9).

(ii) How soon was treatment sought: For male children treatment was sought considerably earlier than for female children. Thus, for 77 percent of males treatment was sought within twenty-four hours of onset of the terminal illness, while for female children only 50 percent had prompt care. This difference was statistically significant at the 5 percent level. High caste mothers generally and significantly ($P<.05$) sought treatment earlier than low caste or intermediate caste mothers. Thus 83 percent of high caste women sought care within 24 hours; only 73 percent of other castes and 52 percent of low caste mothers did so. Neither birth order, birth weight nor the nutritional status at death seemed to have influenced the time interval between the onset of illness and procurement of medical consultation.

3. Summary of Health Benefits

Measurable changes occurred in the health of children in the study villages. These changes will be important variables for future detailed analyses of observed shifts in the fertility patterns in these villages. In summary the health impact of the child care program was as follows:

a. Nutrition services had a demonstrable effect on

1) growth and development as measured by greater weight and height achievements of children in FP+CC and NUT villages, and

2) 1-3 year old child mortality when combined with infectious disease control and treatment in FP+WS+CC and FP+CC villages.

b. Infectious disease control and treatment had a demonstrable effect on

1) 1-12 month old infant mortality when provided through intensive home visiting surveillance visits in FP+CC and IDC villages, and

2) 1-3 year old child mortality when combined with nutrition services in FP+WS+CC and FP+CC villages.

Table IV.D.1

(AVERAGE ESTIMATED RATE OF WEIGHT GROWTH (Kg/Month),
ADJUSTED FOR UNEQUAL SEX-CASTE COMPOSITION,
ACCORDING TO EXPERIMENTAL GROUP AND
MEAN AGE* RANGE AT WHICH WEIGHT WAS MEASURED
(Nutrition Project)

MEAN AGE (Months)	Statistics	EXPERIMENTAL GROUP				
		NUT+IDC (FP+CC)	NUT	IDC	CONT-N	TOTAL
9-14	$\bar{x}$	.193	.223	.198	.130	.184
	s.d.	.11	.08	.11	.11	.11
	n	41	21	34	30	126
14-18	$\bar{x}$	.171	.192	.152	.152	.168
	s.d.	.08	.07	.11	.07	.08
	n	108	51	53	51	263
18-22	$\bar{x}$	.154	.163	.164	.141	.157
	s.d.	.05	.05	.05	.06	.05
	n	175	71	76	38	360
22-25	$\bar{x}$	.155	.144	.168	.137	.154
	s.d.	.04	.04	.04	.06	.04
	n	86	59	36	15	166
25+	$\bar{x}$	.150	.146	.129	.184	.151
	s.d.	.06	.06	.08	.08	.07
	n	77	54	38	32	201

*Only weight measurements at ages at or beyond 9 months were included.

Table IV.D.2

AVERAGE ESTIMATED RATE OF HEIGHT GROWTH (cm/month),
ADJUSTED FOR UNEQUAL SEX-CASTE COMPOSITION,
ACCORDING TO EXPERIMENTAL GROUP AND
MEAN AGE* AT WHICH HEIGHT WAS MEASURED
(Nutrition Project)

MEAN AGE (months)	Statistics	EXPERIMENTAL GROUP				
		NUT+IDC (FP+CC)	NUT	IDC	CONT-N	TOTAL
13-17	$\bar{x}$	1.10	.92	.60	.85	.86
	s.d.	.9	.7	.2	.3	.6
	n	11	7	10	10	38
17-20	$\bar{x}$	.89	1.12	.76	.77	.86
	s.d.	.6	1.1	.4	.4	.6
	n	43	15	25	31	114
20-23	$\bar{x}$	.83	.89	.87	.64	.83
	s.d.	.3	.4	.4	.2	.4
	n	88	51	48	22	209
23-26	$\bar{x}$	.75	.81	.95	.69	.80
	s.d.	.2	.3	.5	.8	.3
	n	112	56	47	8	223
26+	$\bar{x}$	.71	.67	.61	.58	.66
	s.d.	.2	.2	.2	.2	.2
	n	67	40	33	21	161

*Only height measurements recorded at ages at or beyond 13 months were included.

Table IV.D.3

CHILD MORTALITY RATES IN NUTRITION AND POPULATION EXPERIMENTAL GROUPS
1970 - 1973 (Jan.-June)
(Standardized for Caste and Sex Distribution Differentials)

MORTALITY RATES	EXPERIMENTAL GROUPS							
	FP+WS+CC	FP+WS	NUT+IDC (FP+CC)	NUT	IDC	CONT-P+N	CONT-P+N†	ALL
Perinatal*	88	83	47	69	80	92	96	80
Neonatal**	57	60	51	50	55	63	66	57
Postneonatal**	52	56	32	42	25	40	41	43
Infant Mortality**	109	116	81	92	80	103	107	100
13-25 Months***	8	14	11	16	14	23	23	12
36-59 Months***	4	5	3	3	10	4	4	5
Live and Still Births	734	618	548	300	299	724	724	3223

* per 1000 live and still births
** per 1000 live births
***per 1000 population of given age
† adjusted for underreporting

Table IV.D.4

INFANT MORTALITY RATES AND THEIR CHANGE BY EXPERIMENTAL GROUP OVER TWO TIME PERIODS
(Standardized by Caste and Sex Distribution and Differentials)

MORTALITY RATE	EXPERIMENTAL GROUP														
	FP+WS+CC		FP+WS		NUT+IDC (FP+CC)		NUT		IDC		CONT-P+N		ALL		Khanna Study*
	70/71	72/73	70/71	72/73	70/71	72/73	70/71	72/73	70/71	72/73	70/71	72/73	70/71	72/73	1957-1959
Perinatal	78	103	85	81	45	50	81	50	80	82	96	97	69	82	89
% Change	+32.1		-4.7		+11.1		-38.3		+2.5		+1.0		+18.8		
Neonatal	51	66	58	61	49	55	61	34	60	48	71	56	58	56	74
% Change	+29.4		+5.2		+12.2		-44.3		-20.2		-21.1		-3.5		
Postneonatal	55	47	54	56	35	28	40	44	32	13	35	52	43	43	82
% Change	-14.6		+3.7		-20.0		+10.0		-59.4		+48.6		-0		
Total Infant Mortality	106	112	113	117	83	82	101	77	91	63	107	108	102	99	156
% Change	+5.7		+3.5		-1.2		-23.8		-30.8		+0.9		-2.9		

* (Wyon and Gordon, 1971)

Table IV.D.5

CHANGE IN INFANT DEATH RATES BY SERVICE INPUT
(Adjusted for Differential Caste and Sex Composition)

MORTALITY RATES	ALL SERVICE VILLAGES			ALL SERVICE VILLAGES WITH CHILD CARE			CONTROL		
	70/71	72/73	% Change	70/71	72/73	% Change	70/71	72/73	% Change
Perinatal	60	77	+28	69	76	+10	96	97	+ 1
Neonatal	55	56	+ 2	53	55	+ 4	71	56	-21
Postneonatal	46	40	-13	43	36	-16	35	52	+49
Infant	100	97	- 3	96	90	- 6	107	108	+ 1

Table IV.D.6

INTENT TO HAVE ANOTHER CHILD BY BIRTH ORDER OF DECEASED CHILD

INTENT TO HAVE ANOTHER CHILD	BIRTH ORDER OF DECEASED CHILD									
	1		2-3		4-5		6+		ALL	
	#	%	#	%	#	%	#	%	#	%
Yes	20	83	26	67	11	41	4	12	61	49
No	1	4	3	8	8	30	17	50	29	23
Undecided	3	13	10	26	8	30	13	38	34	27
All	24	100	39	100	27	100	34	100	124	100

Table IV.D.7

INTENT TO HAVE ANOTHER CHILD BY TOTAL NUMBER OF ALIVE CHILDREN

INTENT TO HAVE ANOTHER CHILD	NUMBER OF LIVING CHILDREN													
	0		1		2		3		4		5+		ALL	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Yes	24	83	20	74	8	42	7	32	2	25	0	0	61	49
No	1	3	1	4	4	21	7	32	3	38	13	68	29	23
Undecided	4	14	6	22	7	37	8	36	3	38	6	32	34	27
All	29	100	27	100	19	100	22	100	8	100	19	100	124	99

Table IV.D.8

WHETHER PARENTS SOUGHT MEDICAL CARE FOR TERMINAL ILLNESS OF DECEASED CHILD BY PATIENT'S NUTRITION STATUS

NUTRITION STATUS OF DECEASED CHILD*	YES		NO		ALL	
	#	%	#	%	#	%
≥70%	30	86	5	14	35	100
50-69%	31	86	5	14	36	100
<50%	13	59	9	41	22	100
ALL	74	80	19	20	93	100

*Percent of Harvard Standard

Table IV.D.9

WAS TREATMENT SOUGHT BY BIRTH WEIGHT OF DECEASED CHILD

Was Rx Sought \ Birth Weight	<2500 gm			>2500 gm			ALL		
	#	R%	C%	#	R%	C%	#	R%	C%
Yes	27	33	69	55	67	83	82	100	28
No	12	52	31	11	48	17	23	100	22
All	39	37	100	66	63	100	105	100	100

Figure IV.D.1

AVERAGE WEIGHT, ADJUSTED FOR UNEQUAL SEX AND CASTE COMPOSITION AND EXPRESSED AS A PERCENTAGE OF THE HARVARD WEIGHT STANDARD BY INPUT SERVICES

(NUTRITION PROJECT)

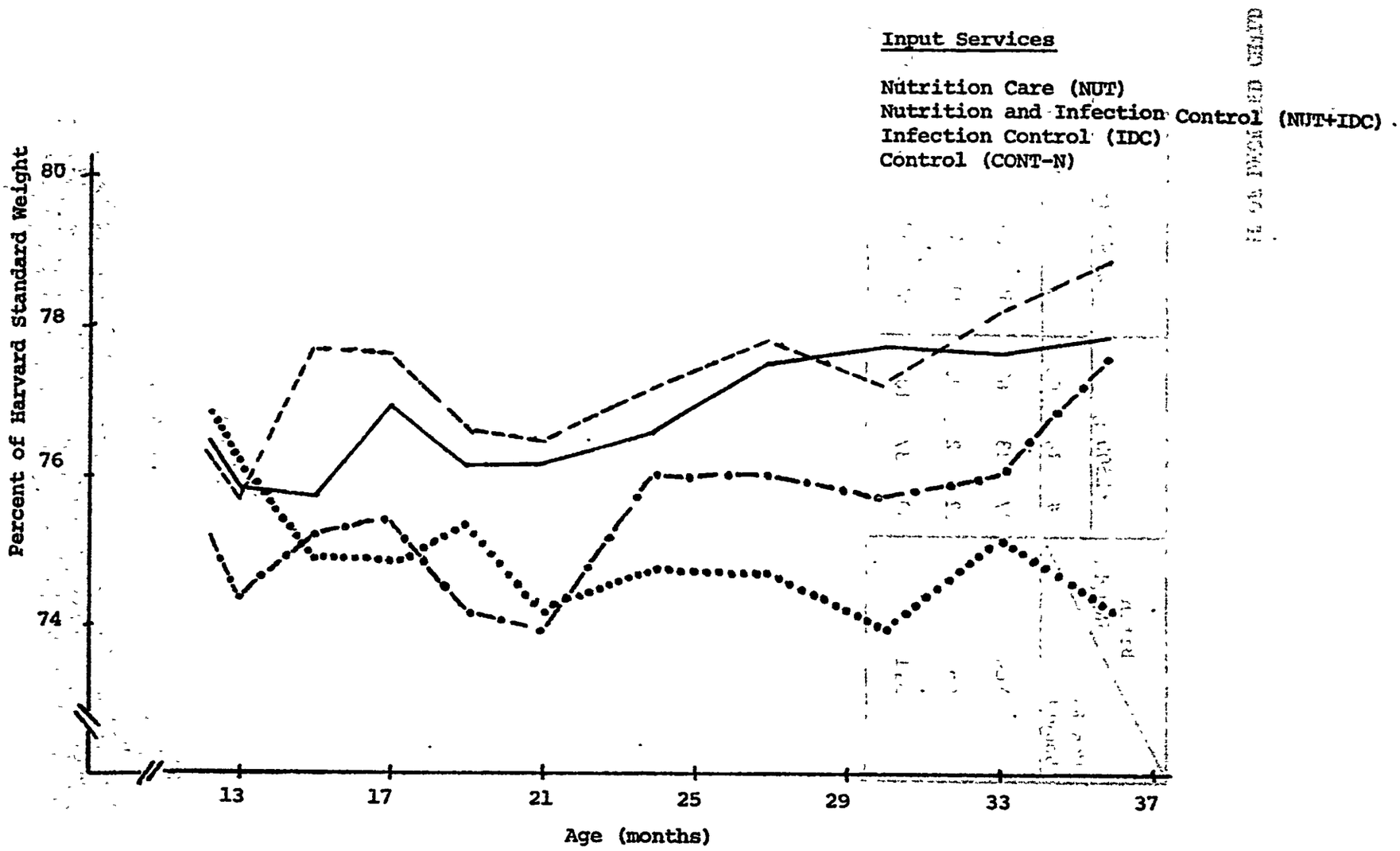


Figure IV.D.2
AVERAGE HEIGHT, ADJUSTED FOR UNEQUAL SEX AND CASTE COMPOSITION AND EXPRESSED AS A PERCENTAGE OF THE HARVARD HEIGHT STANDARD BY INPUT SERVICES (NUTRITION PROJECT)

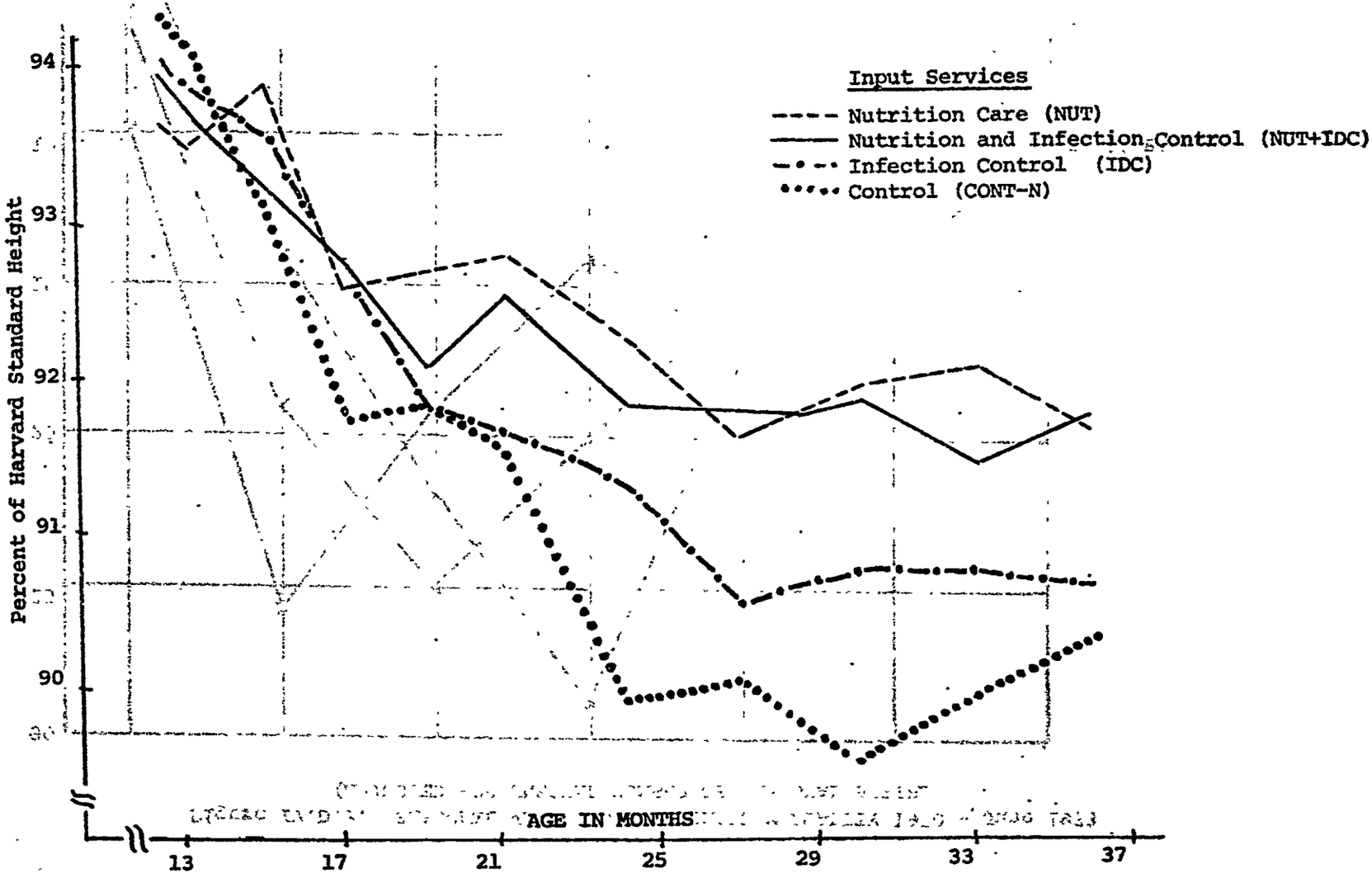
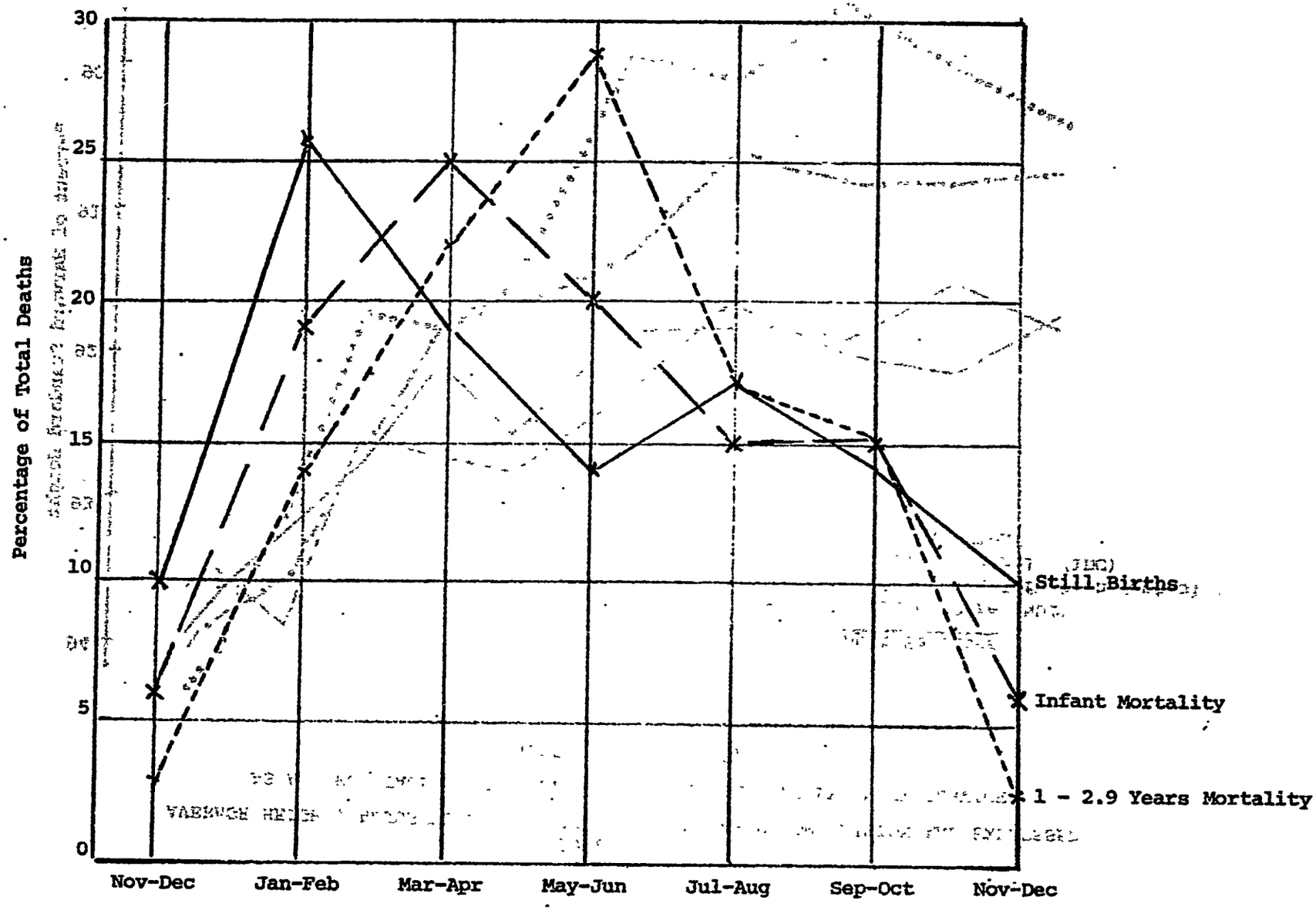


Figure IV.D.3. SEASONAL VARIATIONS IN CHILD MORTALITY 1970 - June 1973
(ADJUSTED FOR UNEQUAL NUMBER OF SEASONAL BIRTHS)



SECTION V

IMPLICATIONS AND RECOMMENDATIONS

SECTION V

IMPLICATIONS AND RECOMMENDATIONS

A. LINKED ANALYSIS

It has not been possible in this report to examine in a precise analytic fashion the multiple associations that might be established between the various independent variables such as socioeconomic level, knowledge, attitudes, beliefs, and service inputs and the dependent variables of family planning acceptance and practice, fertility and mortality. These are the sorts of continuing analyses of the data which we hope to carry out in the coming years. However, this should not detract from a preliminary effort to draw meaningful conclusions from the descriptive findings that have been presented. In addition, as a first step towards a more quantitative analysis, linking of service inputs to family planning output data has been carried out on an aggregate experimental group level in the form of a series of cost-effectiveness, contact-effectiveness, and time-effectiveness ratios. These are presented in Tables IV.A.1 to V.A.6.

1. Cost-Effectiveness

Probably of greatest general interest and certainly the most common indicator for measuring program effectiveness is the ratio of program costs to program output or outcome. In Table V.A.1 costs related to provision of family planning services have been used to calculate the average cost per new acceptor of contraception in each of the experimental groups. These figures are based on the specific costs for the actual time and money spent on family planning and not for the total cost of the service package. Calculations based on total service costs are given in a later section. Actual RHRC costs and estimated Punjab government equivalent costs* per acceptor are given.

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* For an explanation of the calculation of Punjab government equivalent costs see Section III.D.3

Corrections for inflation are also included. Initial rapid increments in acceptors makes the cost per acceptor lower at the beginning of the period under consideration. In the two experimental groups with over five years experience the cost per acceptor doubled during this time period. This increased cost can be seen in the shorter periods of the other experimental groups also. Comparison between groups shows FP+WS+CC having the lowest cost per acceptor (1970 - Rs 92). Costs were about twice as high during the first two years of service even when inflation is accounted for in FP+WS (1970 - Rs 184), FP+CC (1971 - Rs 178) and FP-Ed. (1972 - Rs 198). Similar calculations were carried out in a study of Primary Health Centers in 1968-1969 in the same Community Development Blocks in which our study villages were located. At that time the family planning cost per acceptor was calculated as approximately 80 rupees per acceptor. The RHRC costs in the FP+WS+CC cell are quite close to this level in 1969 and 1970. Ratios calculated using government equivalent costs are lower than, or very close to, the Punjab 1968 costs in several of the cells for a number of the project years.

As more and more couples use family planning methods one would expect to see the cost per unit of use decline in contrast to the cost per new acceptor. This is well illustrated by Table V.A.2 in which the family planning cost per couple-year of contraceptive use is presented. Couple-years of use were estimated from the number of couples using contraception at the midpoint of each year, with sterilizations being counted only if the operation occurred during the years in which RHRC family planning services were available in study villages. Costs were always highest in the first year of the program in each group. They then dropped rapidly in the second year, tapering off to a slow decline or plateau almost one-third the initial cost in the groups with five years of services. Differences between groups in costs per couple-year of use followed a pattern similar to the cost per acceptor. The government equivalent cost per couple-year of use reached a low of Rs 22 (less than U.S. $3) in the FP+WS+CC group while in FP+WS it was Rs 35,

in FP+CC Rs 57, and in FP-Ed. Rs. 101. No data were available in Punjab on current-use rates in 1968 so comparisons with primary health center services was not possible using any measure other than acceptors.

Variations in the inherent effectiveness of contraceptive methods and the care taken in their use influence the actual impact family planning practice has on fertility. In order to derive a measure of use that would more accurately reflect this impact, couple-years of contraceptive use were corrected using the same procedure mentioned in Chapter IV.A.6. This measure of effective use is introduced in Table V.A.3 as "couple-years of effective protection" and has been related to the inflation adjusted government equivalent cost of the family planning services as well as similar costs for all services in each experimental group. To facilitate comparison, cost ratios were calculated for the first and second full years of family planning in each experimental group and, where possible, the ratios of the average costs to average couple-years of effective protection were calculated for the second through third years and second through fifth years of family planning. Couples protected by sterilization prior to the start of the project's family planning services were excluded from these ratios.

In all groups except the FP-Ed, the first year family planning costs per couple-years of protection are fairly similar and about one and a half times the ratios of cost to couple-years of use in Table V.A.2. Similar ratios for the second year show that although cost per couple-year decreased markedly from the first year the overall effectiveness of contraception seems also to have declined in the FP+CC group, producing more of a difference between the use and effective protection ratios.

Although the family planning cost per couple-year of protection is the highest in the FP-Ed group, the second half of Table V.A.3 demonstrates that total program costs per couple-year of protection (Rs 206 or $28) are considerably lower than the other experimental groups. This difference holds in both the years with the FP-Ed group. During the second year of services the next lowest total cost per couple-year of effective protection from pregnancy was in FP+WS (Rs 380), followed by

FP+WS+CC (Rs. 550) and FP+CC (Rs. 598).

If the identification of the most cost-effective approach to family planning were the only objective of this study, it would appear logical to select the FP-Ed approach in the short run with FP+WS also being close. However, effective use of manpower and resources in a setting with both health and family planning objectives would certainly favor the greater efficiency of the FP+WS+CC group in minimizing the family planning cost component while achieving the potential of progressively rising levels of family planning practice.

2. Service-Contact Effectiveness

Ratios similar to those involving cost were calculated substituting family planning service-contacts for costs. Table V.A.4 consolidates in one table these ratios for new acceptors, couple-years of use and couple years of effective protection. Service contacts included both those recorded in service records and those observed during work sampling. They were separated into preacceptance contacts, which were related to new acceptors, and contraceptive service contacts plus follow up contacts that were related to couple-years of use or protection.

The average number of recorded preacceptance contacts required to "produce" one new acceptor ranged in the first year from four in the FP+WS+CC and FP+CC groups to eight in the FP-Ed group. As with costs the ratio rose rapidly each year, but the difference between the FP-Ed and other groups persisted in all three calendar years for which there were comparable data.

Contacts per couple-year of use or protection demonstrated a remarkable stability over the years of the project declining slowly until 1972, then dropping more rapidly in 1973. There was good comparability between experimental groups with the FP+WS+CC and FP+WS groups requiring the least contacts per couple-years of protection and FP-Ed requiring the most. These differences were not great, however, indicating a fairly uniform pattern of services and follow ups. Ratios involving observed contacts varied minimally from recorded contacts ratios

in some groups (FP+WS+CC) and extensively in the others, probably indicating the differences in the volume of informal or spontaneous family planning contacts in these groups.

From these data it seems that the number of preacceptance contacts required to gain acceptance of family planning services will increase with the duration of the program, and will be higher if family planning is not associated with health programs. Other contacts, however, will remain in a fairly constant ratio to the current level of use, depending on prescribed service and follow up patterns.

Table V.A.5 attempts to examine the relationship of the frequency of follow up contacts of the FHW and physician to the methods being used in 1971. There was considerable variation between cells and among the different methods. Follow up of Depo-Provera injections and oral pills involved the most contacts. The FP+WS group consistently had the highest number of follow up contacts per couple-years of use for Depo-Provera, seemingly many more than the once every three months injection should require. It is difficult to explain this frequency without a much more detailed analysis of the content of these contacts but an impressionistic explanation is that the extra contacts were for the purpose of explaining and encouraging patients to continue in spite of menstrual irregularities. In addition, monthly contacts were often made to supply estrogen tablets to initiate withdrawal bleeding.

To remove any doubt about the effort that was invested by FHWs in trying to promote pills it is worth noting the very large ratios of follow up contacts required to maintain couple years of use in this population. In spite of this investment pills were poorly used and had a high drop out.

3. Time-Effectiveness

Data on time spent specifically for family planning were available for the years 1971 and 1974. These figures obviously do not relate to total working time. In a fashion similar to Table V.A.4 for contacts, Table V.A.6 presents the worker time required per new acceptor and couple-year of use or protection. Data were limited to the FHW and

FPE in 1974 so that comparable FHW data are also shown for 1971. In 1971 the average time all the staff spent on preacceptance activities per new acceptor was the highest in the FP+WS group. However, services and follow up per couple year of use of family planning required the greatest time input in the FP+CC group in the same year. The drop out rate was also highest in this group of villages. The large investment of time of the woman doctor assigned specifically for family planning in FP+CC villages as distinct from child care showed up distinctly in the differences between the total staff time and the FHW time. Otherwise the variations in the time of the FHWs paralleled the overall staff time differences in 1971. However, by 1974 the FHW time required per new acceptor had increased markedly as compared with 1971, with the FP+CC group surpassing FP+WS.

The time spent by FPEs per new acceptor was available only in 1974 and as would be expected was many times greater than the FHW input in other experimental groups. Time requirements for FHWs per couple-year of use, like service-contacts, did not vary much between years, and that of the FPEs in 1974 was fairly close to the FHWs. The 1974 investment of time per couple year of protection, however, shows more variation with FP+WS+CC being lowest (39 minutes per couple year of protection), FP+WS and FP+CC being about twice as much (77 and 69 minutes) and FP-Ed being almost three times greater (109 minutes).

Overall, as in the case of time per acceptor, the FHWs in the FP+WS+CC group invested the least amount of time per couple-year of effective protection in purely family planning activities. Considering the relatively similar patterns of contraceptive use in all the experimental groups it is apparent that provision of a combination of services such as in the FP+WS+CC group of villages utilizes the time of staff most effectively if the purpose is to provide both health and family planning services.

Table V.A.1

AVERAGE FAMILY PLANNING SERVICE COST PER NEW ACCEPTOR IN EACH EXPERIMENTAL GROUP BY CALENDAR YEAR - RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES*

	YEAR	EXPERIMENTAL GROUP							
		FP+WS+CC		FP+WS		FP+CC		FP-ED	
RHRC	1969	97	(105)	154	(166)	-	-	-	-
	1970	92		184		-	-	-	-
	1971	119	(110)	224	(226)	192	(178)	-	-
	1972	164	(141)	196	(168)	317	(272)	231	(198)
	1973	262	(208)	426	(338)	441	(350)	343	(272)
	1974	262	(208)	301	(239)	620	(492)	468	(372)
GOVT. EST.	1969	52	(56)	82	(89)	-	-	-	-
	1970	46		86		-	-	-	-
	1971	51	(47)	99	(92)	54	(50)	-	-
	1972	79	(68)	90	(77)	98	(84)	111	(95)
	1973	145	(115)	250	(199)	238	(189)	193	(153)
	1974	145	(115)	176	(140)	334	(265)	263	(209)

* Conversion of Rupees to U.S. dollars: 7.5 Rupees = $1

Note: Numbers in parentheses are costs standardized to 1970 price levels assuming an average annual inflation of 8 percent. Calculations of 1974 cost per acceptor utilized acceptors for the period January 1, 1974 to March 31, 1974 and assumed continuation of expenditures at 1973 levels.

Table V.A.2

AVERAGE FAMILY PLANNING SERVICE COST PER COUPLE-YEAR
OF CONTRACEPTIVE USE* IN EACH EXPERIMENTAL GROUP BY CALENDAR YEAR
RHRC AND ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES

	YEAR	EXPERIMENTAL GROUP							
		FP+WS+CC		FP+WS		FP+CC		FP-ED.	
RHRC	1969	163	(176)	227	(245)	-	-	-	-
	1970	77		129		-	-	-	-
	1971	69	(64)	113	(105)	381	(353)	-	-
	1972	57	(49)	85	(73)	212	(182)	554	(475)
	1973	59	(47)	81	(64)	147	(117)	279	(222)
	1974	51	(40)	75	(60)	133	(106)	227	(180)
GOVT. EST.	1969	88	(95)	120	(130)	-	-	-	-
	1970	39		60		-	-	-	-
	1971	29	(27)	46	(43)	106	(98)	-	-
	1972	27	(23)	39	(33)	66	(56)	266	(228)
	1973	33	(26)	48	(38)	79	(63)	157	(124)
	1974	28	(22)	44	(35)	72	(57)	128	(101)

* Couple-years of contraceptive use were based on the numbers of current users at the mid point of each year. Couples sterilized prior to the start of project family planning services excluded.

Note: Numbers in parentheses are costs standardized to 1970 price levels assuming an average annual inflation of 8 percent. Calculations of 1974 cost per couple year of use utilized the mean number of current users between December 31, 1973 and March 31, 1974 and assumed continuation of expenditures at 1973 levels.

Table V.A.3

AVERAGE FAMILY PLANNING AND TOTAL SERVICE COST PER COUPLE-YEAR OF EFFECTIVE PROTECTION FROM PREGNANCY* IN EACH EXPERIMENTAL GROUP BY SPECIFIED TIME PERIODS - ESTIMATED GOVERNMENT EQUIVALENT COSTS IN RUPEES STANDARDIZED TO 1970 PRICES

		EXPERIMENTAL GROUP			
	YEAR	FP+WS+CC	FP+WS	FP+CC	FP-ED.
FP COST	1	125	162	155	329
	2	55	86	111	189
	2-3 mean	47	71	110	-
	2-5 mean	40	59	-	-
TOTAL COST	1	1079	646	890	361
	2	550	380	598	206
	2-3 mean	472	324	548	-
	2-5 mean	368	235	-	-

*Couple-years of effective protection from pregnancy were estimated from method specific use data and the frequency of pregnancy occurring during the use of each particular method as compared to a non-contracepting population (see page IV.A.6). Couples protected by sterilizations occurring prior to the start of project family planning services are excluded.

Table V.A. 4

AVERAGE NUMBER OF PREACCEPTANCE FAMILY PLANNING CONTACTS PER NEW ACCEPTOR, AND CONTRACEPTIVE SERVICE AND FOLLOW-UP CONTACTS PER COUPLE-YEAR OF USE OR COUPLE-YEAR OF EFFECTIVE PROTECTION IN EACH EXPERIMENTAL GROUP BY CALENDAR YEAR OR TIME PERIOD. (RECORDED CONTACTS OF ALL STAFF FOR 1969-1973 IN ALL GROUPS PLUS 1974 IN FP-ED., OBSERVED CONTACTS OF THE FHW OR FPE FOR 1974 IN PARENTHESIS.)

EXPERIMENTAL GROUP

	YEAR	FP+WS+CC	FP+WS	FP+CC	FP-ED.
Preacceptance contacts per new acceptor	1969	4	5	-	-
	1970	8	11	-	-
	1971	10	17	4	-
	1972	26	35	11	8
	1973	45	49	13	15
	1974	(35)	(47)	(105)	46 (79)
Service and follow-up contacts per couple-year of use	1969	14	13	-	-
	1970	14	10	-	-
	1971	10	11	12	-
	1972	9	9	11	19
	1973	7	5	6	12
	1974	(9)	(20)	(18)	11 (16)
Service and follow-up contacts per couple-year of effective protection	1	18	16	20	39
	2	19	14	21	19
	2-3 mean	17	15	15	-
	2-5 mean	13	12	-	-

Note: For definitions of Couple-Years of Use and Couple-Years of Effective Protection see Tables V.A.2 and V.A.3. Couples sterilized prior to the start of project family planning services excluded.

Table V.A.5

AVERAGE NUMBER OF RECORDED FAMILY PLANNING FOLLOW-UP CONTACTS PER COUPLE-YEAR OF USE AND COUPLE-YEAR OF EFFECTIVE PROTECTION BY CONTRACEPTIVE METHOD USED (FHW AND PHYSICIAN CONTACTS FOR 1971)

	METHOD	FP+WS+CC	FP+WS	FP+CC
Follow-up contacts per couple-year of use	IUD	7	3	-
	Sterilizations*	1	2	1
	Condoms	2	2	1
	Oral Pills	12	8	13
	Depo-Provera	10	16	9
	TOTAL**			
Follow-up contacts per couple-year of effective protection	IUD	8	4	-
	Sterilizations*	1	2	1
	Condoms	7	5	4
	Oral Pills	45	27	39
	Depo-Provera	11	18	10
	TOTAL**	9	9	8

* Couples sterilized prior to the start of project family planning services excluded.

** Totals include some follow-up contacts with method not specified.

Note: For definitions of Couple-Years of Use or Couple-Years of Effective Protection, see Tables V.A.2 and V.A.3.

Table V.A.6

AVERAGE PREACCEPTANCE FAMILY PLANNING TIME SPENT PER NEW ACCEPTOR, AND CONTRACEPTIVE SERVICE AND FOLLOW-UP TIME SPENT PER COUPLE-YEAR OF USE OR COUPLE-YEAR OF EFFECTIVE PROTECTION IN EACH EXPERIMENTAL GROUP (DIRECT SERVICE TIME IN MINUTES OF ALL STAFF IN 1971 AND OF THE FHW OR FPE IN 1971 AND 1974).

		EXPERIMENTAL GROUP			
		FP+WS+CC	FP+WS	FP+CC	FP-ED.
Preacceptance Time Per New Acceptor	ALL 1971	107	147	92	-
	FHW 1971	35	66	28	-
	FHW/FPE 1974	90	106	262	642
Service and Follow-Up Time per Couple-Year of Use*	ALL 1971	54	63	157	-
	FHW 1971	32	48	66	-
	FHW/FPE 1974	25	55	44	63
Service and Follow-up Time per Couple-Year of Effective Protection*	ALL 1971	81	90	247	-
	FHW 1971	49	69	104	-
	FHW/FPE 1974	39	77	69	109

* Couples sterilized prior to the start of project family planning services excluded.

Note: For definitions of Couple-Years of Use or Couple-Years of Effective Protection see Tables V.A.2 and V.A.3.

B. RECOMMENDATIONS

1. Recommendations for Service Programs

This research provides a basis for judging the patterns of services that might most usefully be tried either in a demonstration project or national program. The recommendations that follow are straightforward conclusions that will obviously have to be adjusted and adapted to particular situations. Our results have defined particular service packages, demonstrated impact in health and family planning outcomes, and attached a"price tag"to each package. The planner or administrator then can put together particular combinations and adaptations to meet his own needs. For further adaptations a demonstration project would be needed to refine procedures. In the choice of services and their adaptation two major considerations will be: a) the particular objectives to be achieved and b) the time frame within which results are to be expected.

a. If the sole objective is to get maximum family planning practice in one or two years, it makes sense to develop a program focussing on family planning services and education. In the short run, a village-based family planning education program backed up by a good contraceptive delivery system is more efficient and possibly more effective than the other service combinations. The family planning education should combine home visits and group sessions. Contraceptive delivery should use all routes and include all family planning methods and it should be easily accessible near village homes. The study was terminated before the long term impact of such a program could be measured and we have no way of knowing where a plateau would have occurred. It should be noted, however, that the family planning educators and their clients were becoming increasingly bored with just presentations of family planning messages and were moving into general educational efforts relating to women's activities in the home.

b. If the sole objective is fertility limitation but the time frame is extended to 3-5 years we have good evidence that a highly cost/effective package is to combine family planning and women's services.

There are great advantages in access to women for family planning motivation and in our project the greatest use of family planning occurred with such a program.

c. If the purpose is to improve maternal health in addition to increasing the use of contraception then family planning and women's services is an even more attractive combination. Even though our population samples were not large enough to get good outcome data we have abundant output data showing the great increase in health services provided to women. The efficiency of such services in such important variables as cost/effective use of personnel and their satisfaction was considerably augmented over services limited to family planning.

d. If family limitation objectives are placed in a time frame over five years we have no definitive data but some circumstancial evidence suggesting that the most effective approach is to integrate family planning, women's services and child care. From the beginning we recognized that the child survival hypothesis would probably have a built in lag period of at least 5 years while parents became aware of declining mortality and improved health of their children. The project did not continue long enough to provide a definitive answer. The objective was to link these activities through the use of family planning entry points as part of child care routines. If the project had not been terminated we had expected to see whether the plateau in current users of family planning in FP+CC would have begun to slope upward again and whether FP+WS+CC would have continued to a higher level of current use before plateauing than FP+WS. The intermediate evidence supporting the child survival effect is:

1) the impact in age parity grids in FP+CC and FP+WS+CC suggested more tendency to reduce excess fertility than in FP+WS.

2) a constellation of cross-tabulation relationships in the Attitudes and Beliefs surveys showed a definite effect in FP+WS+CC supporting a shift in subconscious awareness of child survival and its relation with variables associated with the use of family planning.

e. If a major objective is reduction of infant mortality in a food surplus area such as the Punjab then the focus should be on a child centered program with frequent (intervals of perhaps 2 weeks) contacts or monitoring in order to detect and intervene early in infectious illnesses. This is costly but at Narangwal proved most effective for children under 1 year.

f. If a major objective is to reduce 1-3 year child mortality then a program of nutritional supplementation has been shown to be effective. In addition a program synergism was demonstrated with infection control measures that did not need to be as intensive as in FP+CC (monitoring at intervals of 2-3 months seemed sufficient). The FP+WS+CC combination was preferable both in efficiency and effectiveness.

g. Reduction of perinatal mortality was not accomplished by any of the Narangwal services. We would recommend a considerable revision of our maternal care services with particular attention to the primary causes of perinatal death, ie., prematurity and birth trauma.

1) Maternal nutritional supplements should be augmented to reduce prematurity and low birth weight.

2) Much more careful training and supervision of birth attendants with more adequate back-up services should be provided.

3) This would require more prenatal health and nutritional education of the mother.

h. All of the above services can be delivered with maximum cost/effectiveness by auxiliaries such as the Narangwal family health workers, carefully supervised and supported by back-up services and continuing education.

i. In summary, to get the most efficient and effective long term balance of both family planning and health objectives there is no question that the combined FP+WS+CC approach is to be recommended on the basis of Narangwal experience. Certain modification in our services are suggested:

1) Maternal delivery services and nutrition should be augmented.

2) The frequency of surveillance for health problems of children less than 1 year should be increased.

3) The time spent on curative services should be decreased for the greatest cost/effectiveness especially for adults and children over 3 years. Of course political pressures and the natural tendency of health workers to gravitate into curative work because of the gratifications of patient contact will have to be coped with. This will require intensified training and careful supervision of primary care workers.

4) To maximize the family planning impact: the time and frequency of family planning follow up contacts should be increased to minimize drop-outs; more attention should be paid to promoting transitions between the use of specific contraceptive methods, especially the shifting from simpler contraceptive methods to overcome the initial resistance we found in the Punjab to pills and to rehabilitation of the IUD; and to make more effective use of women's groups and community relationships in increasing motivation for family planning as was being done most effectively in FP-Ed.

2. Recommended Research

As with any research project that makes fundamental contributions to understanding, the Narangwal project raised more questions than it answered. The premature termination of the project accentuated the obvious fact that further research is needed. From our experience the gratuitous comment can be made that the commitment, persistence and patience that this kind of prospective research demands should lead to caution in undertaking such studies except where conditions for completion and for high quality field work are good. Since so much effort must go into the field work it is especially important that the research be done right and that lessons from the experience of projects such as Narangwal should be passed on for those undertaking new projects. These recommendations for future research will be made under three headings: further analysis of Narangwal data, recommendations for demonstration projects using Narangwal findings, and recommendations for further full scale research.

a. Further analysis of Narangwal data

The large amount of information accumulated from a defined population offers a considerable resource for more complete analyses than have been possible within the time and funding that have been available heretofore. When the projects were planned, data collection was specifically designed in a format to permit multiple ancillary analyses of great intrinsic importance. The effort and investment in prospective field research is so great that the maximum scientific use should be made of data that have been so laboriously gathered. Analysis of these data should serve to isolate critical variables and to assess the dynamics of change in them over time.

Work to date has concentrated on analysis within the various sub-systems with the aim of identifying key variables, combining them into appropriate indices, and describing fundamental associations. This now permits more sophisticated in-depth statistical analyses designed to identify multivariate cause-and-effect associations. At the next stage of the analysis we also propose to examine interactions between these sub-system dynamics, for example, the effect on contraceptive behavior of changing socioeconomic status. In summary, these analyses would cover the interactions between the following areas:

1) Measurement of family social and economic characteristics and patterns of change as indicated by repeated household surveys.

2) Measurement of attitudes and beliefs and patterns of change as indicated from repeated surveys.

3) Detailed assessment of human, physical and financial resource inputs related to service programs, individually and in combination.

4) Careful quantification of family planning utilization data. These have already been organized onto computer tapes in the form of a women's register so that a longitudinal contraceptive history is available. This includes pregnancy interval data such as periods of postpartum amenorrhea.

5) Appraisal of health status and health benefits under the different programmatic conditions reflected in the experimental design.

6) A dynamic appraisal of fertility status based upon both a life table approach to changes in parity and analysis of the components of pregnancy intervals, open and closed.

An important product of the foregoing sub-analyses will be a consolidated set of critical variables and indices. As a result, the comprehensive analysis of the total system under study will become manageable. The purpose of such an analysis will be to relate specific program effects to input requirements in view of population characteristics which either facilitate or inhibit program effectiveness. A clearer understanding of these relationships should contribute to more effective programmatic decision making. In particular, the dynamic systems analysis envisioned will permit appraisal of both the immediate and secondary impacts of program interventions at specific points in the system. For example, should a couple who has used contraception for child-spacing be approached differently for purposes of family size limitation than one with no previous contraceptive experience?

Looking beyond the analysis of the Narangwal experience, we recognize the need for more generalized and streamlined methods of community assessment of health and demographic status. Thus we expect to be able to apply the knowledge gained from the Narangwal analyses to development of generalized recommendations for community assessment that will serve both as a means of appraising current status and of suggesting possible alternatives and priorities for intervention.

Findings from these analyses can be fed directly into policy definition. Many practical questions are being asked that focus on cost/benefit issues in allocation of national and international resources. Too often the data that are available from surveys or reported statistics are focussed only on particular parts of the complex interactions between health, population and development. The information available for analysis here is unique in its coverage of sectors, in its

being longitudinal and prospective, in having an experimental design permitting direct testing of causal relations, and in having both cost and benefit components. By asking specific questions on particular interactions these data can provide answers within the broader matrix of other interactions. Once these data are in shape for specific analyses they can also be used by other research workers to answer their questions.

b. Recommendations for demonstration projects in general - implementation of Narangwal findings

From the beginning of the research at Narangwal there was an obsession with the need for rapid implementation. Conferences at Narangwal and frequent consultations with officials and educators in India were designed specifically to get their experience and wisdom in the interpretation of data. As data became available policy and program decision makers were asked to tell us what the data meant in the context of how they could be used. This process led to extremely rapid dissemination and implementation of the more obvious findings. As the Narangwal Rural Health Research Center became an increasingly Indian activity under the Indian Council of Medical Research the process was additionally enhanced.

To get wider implementation of the Narangwal pattern of services negotiations were started early that collaborative activities based in Indian institutions should move from this kind of intensive research effort to demonstration projects as soon as possible. With officials in the Ministry of Health and Family Planning and in the Indian Council of Medical Research it was agreed that the first demonstration project should be in a particularly needy area of a state such as Bihar or U.P. At least a full community development block would be involved in a collaborative trial under the State health services, resources would be strictly limited to what would be available in mass implementation, the involvement of communities in solving their own problems would be a major objective, and the demonstration project should be planned so as to serve eventually as a training base for integrated

services for the whole state. Then similar demonstration/training blocks could be developed within selected primary health centers of other states as appropriate.

Because of termination of the Narangwal project these collaborative plans were deferred. However, an opportunity to proceed with a demonstration of the application of Narangwal findings did present itself in the Companyganj Project in Noakhali District, Bangladesh. This project is funded and run by the Christian Commission for the Development of Bangladesh and the Christian Medical Commission in Geneva with technical personnel being supplied from Johns Hopkins.

The project is located in a Thana (an administrative area) of 120,000 population. In the first 23 months of operation, the following has been accomplished:

1) A system has been established in which both male and female workers are in regular contact with every house in the Thana, supported by clinic facilities within two miles of almost every house and limited but effective hospital service within three miles.

This system is compatible with government plans for health and family planning. In fact, as a result of recent changes, it is almost exactly the same as the government program which is to be established over the next five years.

2) Sixty-four local people, including 36 women, have been recruited and trained and are now working effectively as village level medical and family planning workers.

3) A group of physicians, nurses, lady health visitors, and administrative officers has worked for two years to develop the project and they have demonstrated their ability to manage it over the next three years. Most now desire to work permanently in rural programs of this sort. Two physicians are being sent for a year of advanced training which will make it possible for them to return to manage the project, evaluate its results and develop programs for government personnel sent to Companyganj for training.

4) A local committee has been established which has authorized a system of charges in clinics and hospital and which proposes to provide support for the nutrition program. This committee is in a position to mobilize significant local resources, but it remains to be seen whether this will occur.

5) Finally, results in the first two years (with the ful program operating only for the last few months), show encouraging progres toward the following specific objectives:

a) Family planning acceptance has been higher than anticipated, and should exceed 20% by the end of this year.

b) Acceptance of the child care program has increased steadily. An effect on infant and age 1-3 mortality should be apparent in the mortality survey in 1976.

c) The nutrition survey already shows evidence that nutritional status is better and mortality rate lower among those children who use the supplement. Confirmation of this will be possible when the survey is completed in September 1975.

d) Control of malaria and smallpox has been effective, despite addition of family planning and other duties to the field worker's responsibilities.

e) Basic medical care has been made widely available through clinic and hospital at extremely low cost.

In the further development of demonstration projects the availability of Narangwal data will permit the simulation of service packages before they are field tested in a service oriented setting. This process would also help in the difficult process of redefining roles in the primary care health team, supervisory patterns, standing orders and training programs. We have developed a total conceptualizatior of this process that should facilitate the adaptation of programs to new situations.

c. Recommendations for new research projects

The most obvious unanswered question that this research has put into sharper focus is - what is the real validity and importance

of the child survival hypothesis? Considerable information on this question has been mobilized from surveys and action programs. All the data point in the same direction. The first need is to distinguish clearly between child survival motivational concerns and the biological effects of lactational amenorrhea. Both forces produce similar results in shortening birth intervals after child loss. There seems to be no question that the lactation effect is strong and it is probable that continued breast feeding may be among the most important current methods of spacing in village populations, especially where mothers are malnourished.

Beyond this, however, it is still important to measure the strength of possible concerns about child survival on the dynamics of decisions about family size. If awareness of child survival is normally a subconscious influence creating a general expectation within which immediate decisions about family limitation are made, as we now think, then it is tremendously important to know two things: first, can the lag between falling death rates and birth rates be shortened by increasing the awareness of child survival and using the healthy child as an audiovisual aid for this purpose as we seem to have done in FP+WS+CC; and second, can this awareness be built directly into accelerating the acceptance of family planning through the routine use of family planning entry points in a large scale program of integrated services.

A potentially important point to be considered in relation to the child survival hypothesis is that it may provide a direct handle on the initiation of motivational change in deprived populations in absolute or relative poverty who are in greatest need of an entering wedge for the whole development process. It may be that this motivational linkage is intimately related to a general orientation to development which will be evidenced by willingness to plan ahead and try new things in a pattern of entrepreneurship. Parents who are aware that their children are surviving and have a reasonable chance for good health may be strongly motivated not only to limit their families but

also to be less fatalistic in their view of the future generally and to put in the extra effort and work required to improve the general quality of life.

We have learned a great deal about what should be done in the future research; for instance, the attitudes and beliefs questionnaire that we developed can now be greatly improved and streamlined. It would be essential to develop any new research effort within a sufficiently long time frame to ensure that family planning current use curves would really plateau. This requires more than 5 years for adequate testing of the child survival effect.

In developing the research design clear definition would be needed of: long run rather than short run goals; an optimal sequencing of program increments; a balancing of ultimate rather than immediate cost/effectiveness measures; etc.

Finally, a major research need is to develop better conceptualization and technical skills in handling the design of projects in which multiple objectives have to be balanced. The interactions between health, population, nutrition and other development sectors are so apparent today that it is totally inappropriate to study any one set of variables in isolation. But the conceptual difficulties are great and the measurement problems complex. There is a hazard that research will be either superficial or will just contribute to present confusion.

Among the steps that need to be taken are: a) clear definition of the relative importance and utility of each of the objectives; b) clarification of measurement methods that will quantify the composite impact of integrated programs along multiple dimensions, perhaps involving new data collection methods such as the functional analysis methodology we have developed where all items of information are classified according to a limited set of functions; c) sharpening up of decisions about whether it is possible or desirable to develop a single or a limited number of measures or indices of effectiveness or efficiency which will incorporate performance relative to several different

objectives; d) awareness of the need in balancing relationships between multiple objectives of developing understanding of when results are conflicting vs. those that show complementarity, or the extent to which service components are either synergistic or antagonistic.

BIBLIOGRAPHY

Chandrasekhar, Sripati 1972. Infant Mortality, Population Growth and Family Planning in India. Chapel Hill: University of North Carolina Press.

Easterlin, Richard A. 1974. "The Economics and Sociology of Fertility: A Synthesis," in Tilly, C., Ed., Early Industrialization: Shifts in Fertility and Changes in Family Structure. Princeton: Princeton University Press.

Government of Punjab (India) 1971. Statistical Handbook 1970-71. Chandigarh: Government of Punjab, India.

Government of Punjab (India) 1971. Sample Registration of Births and Deaths Facts and Figures for the Year 1969. Director, Health and Family Planning, Punjab, Chandigarh, India.

Government of Punjab (India) 1973. Punjab Agricultural Handbook 1974. Chandigarh: Government of Punjab, Dept. of Economics and Sociology. Ludhiana: PAU Press.

Guzman, et al 1968. "Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964 (VII)." Arch. Env. Hlth. (Chicago) 17:107.

King, M. et al 1972. Nutrition for Developing Countries. Nairobi: Oxford University Press.

Mamdani, M. 1973. The Myth of Population Control. New York: Modern Reader.

Population Council 1963. "India: The Singur Study." Studies in Family Planning No. 1, July, 1963.

Ridker, R.G. and Muscat, R.J. 1973. "Incentives for Family Welfare and Fertility Reduction: An Illustration for Malaysia." Studies in Family Planning Vol. 4 No. 1, pp. 1-10.

Taylor, C.E.; Newman, J.S. and Kelly, N.U. 1975. "The Child Survival Hypothesis." Population Studies (coming issue).

Uberoi, I.S. et al 1974. Child Health Care in Rural Areas: A Manual for Auxiliary Nurse Midwives. Rural Health Research Center, Narangwal, Punjab, India. New Delhi: Asia Publishing House.

USAID 1970. Population Program Assistance. AID Office of Population, Wash., D.C.

Wyon, J.B. and Gordon, J.E. 1971. The Khanna Study: Population Problems in the Rural Punjab, Cambridge: Harvard University Press.

Zatuchni, G.E., ed. 1970. Postpartum Family Planning: A Report on the International Program. New York: McGraw-Hill for Population Council.

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